

## Table of contents

Instructions: W0010048

Product: NC alternator  
Part no.: 0 120 465 ..

Special features	I02/1
Structure, usage	I08/1
General information	I09/1
Safety measures	I11/1
Testers, equipment, tools	I13/1
Test specifications	I15/1
Tightening torques	I16/1
Circuit diagram	I17/1
Alternator disassembly/testing table	I25/1
Component cleaning	II24/1
Alternator assembly table	II26/1
	III12/1

Continue: I01/2

---

## Table of contents

Editorial note IV05/1

Continue: I01/1

## SPECIAL FEATURES

These instructions contain repair information and the corresponding test specifications for the following alternators

Part nos.:                    0 120 465 ...  
                                0 123 2.. ...  
                                0 123 5.. ...

Type:                        NC R 14V 100A  
                              NC R 14V 120A  
                              NC R 14V 150A

Continue: I02/2

---

## SPECIAL FEATURES

Type:                        NC R 14V 60- 90A  
                              NC R 14V 45-140A  
                              NC R 14V 55-100A  
                              NC R 14V 60-110A  
                              NC R 14V 60-120A  
                              NC R 14V 60-130A  
                              NC R 14V 65-115A  
                              NC R 14V 65-130A  
                              NC R 14V 70..115A  
                              NC R 14V 70-120A  
                              NC R 14V 73-143A  
                              NC R 14V 90-150A  
  
                              NC R 28V 30- 65A  
                              NC R 28V 40- 90A

Continue: I03/1

## SPECIAL FEATURES

### NOTE:

These repair instructions were compiled on the basis of the following alternators

Type:	NC R 14V 70-120A
Part no.:	0 123 510 033
Type:	NC R 14V 90-150A
Part no.:	0 123 520 010
Type:	NC R 28V 40- 90A
Part no.:	0 123 525 501

The different alternator versions can be seen from the corresponding parts lists.

Continue: I03/2

---

## SPECIAL FEATURES

### NOTE:

There are two types of rotor mounting in the drive end shield.

- Deep-groove ball bearing pressed into drive end shield, clearance fit on rotor shaft
- Deep-groove ball bearing pressed onto rotor shaft, clearance fit in drive end shield

The different versions can be seen from the appropriate parts lists.

Continue: I04/1

## SPECIAL FEATURES

Alternators of this type are fitted with a monolith or multifunction regulator.

Multifunction regulators have the following features:

- Voltage actual value and excitation current via connection B+
- Pre-excitation clocked via B+
- Connection, terminal L (detection of ignition switch on, fault display)
- Load-response starting (no supply of current during and immediately after starting; optional)

Continue: I04/2

---

## SPECIAL FEATURES

- Load response/driving (power supply constantly increased via ramp; optional)
- Connection/DF monitor (evaluation of current alternator load; optional)
- Connection/terminal S (battery "Sense", voltage signal directly from battery; optional)
- Thermal regulation of regulator voltage (optional)

Continue: I05/1

## SPECIAL FEATURES

### NOTE:

If checking with oscilloscope reveals that rectifier unit is OK, it is not necessary to separate rectifier unit/stator.

Never block fan and pulley with a screwdriver or the like when dismantling or assembling. Bent or damaged fan blades will cause damage to the alternator.

Continue: I05/2

---

## SPECIAL FEATURES

The entire assembly is geared to the alignment of the V-belt. Modifications or assembly errors can lead to damage.

Continue: I06/1

## SPECIAL FEATURES

The alternator housing is made of die-cast aluminum. Particular care is to be taken on dismantling and assembly as the housing is susceptible to damage. Deformation and surface damage may permanently impair the fit accuracy of the alternator components. This can result in damage to the alternator during operation.

Continue: I06/2

---

## SPECIAL FEATURES

After performing repairs, the function of the alternator is to be checked on a suitable test bench.

Continue: I07/1

## SPECIAL FEATURES

Explanatory notes on alternator labelling, e.g.: NC R 14V 70-120A

N = Size

G = 100...109 mm  
K = 120...129 mm  
N = 130...142 mm

C = Type of alternator

1 = Claw-pole alternator  
2 = Salient-pole alternator  
3 = Windingless rotor alternator  
C = Compact alternator

Continue: I07/2

---

## SPECIAL FEATURES

NC R 14V 70-120A

R = Direction of rotation

-> or R = Clockwise  
<- or L = Counter-clockwise  
<-> or RL = Clockwise and counter-clockwise

14V = Alternator voltage in volts

70- = Rated current in A measured at  
n = 1800 min<sup>-1</sup>

120A = Rated current in A measured at  
n = 6000 min<sup>-1</sup>

Continue: I01/1

## STRUCTURE, USAGE

PC user prompting:

Position cursor on button and confirm.

Microcard user prompting:

User prompting is provided on every page e.g.:

- Continue: I 17/1
- Continue: II 18/1 Fig.: II 17/2

Brief instructions may include several rows of coordinates.

I.../. = first coordinate row

II.../. = second coordinate row

III.../. = third coordinate row

etc.

.../1 = upper coordinate half

.../2 = lower coordinate half

Continue: I01/1

## **GENERAL**

Expert repairs are only possible using the prescribed tools and measuring instruments, which are in perfect working order. We therefore recommend that exclusive use be made of the tools listed.

The use of incorrect and unsuitable tools and testers can lead to injury and may damage the product concerned or its component parts.

Continue: I09/2

---

## **GENERAL**

Exclusive use is to be made of service parts as per applicable parts list for type of alternator concerned.

To ensure proper functioning, use must be made of the materials prescribed in these instructions.

Ensure absolute cleanliness when performing repair work.

Continue: I10/1

## **GENERAL**

**Tester and object being tested must be at room temperature for all checks performed during repair work.**

**The stated test values are referenced to a temperature of 20 C.**

**Continue: I01/1**

## **SAFETY MEASURES**

### **ATTENTION: DANGER OF FIRE**

For transmitter and receiver interference suppression purposes, alternators are fitted with capacitors with a long storage time.

When washing out alternator components, immersion in cleaning fluid may result in capacitor discharge and cause flammable liquids to ignite.

Continue: I11/2

---

## **SAFETY MEASURES**

For this reason, components with capacitors are only to be washed out using cleaning agents (e.g. HAKU 1025/6) which are not readily flammable.

Continue: I12/1

## **SAFETY MEASURES**

Always heed the following safety regulations:

- \* German Order governing the use of flammable liquids (VbF).
- \* Accident prevention regulations for electrical systems and equipment.
- \* Safety regulations for the handling of chlorinated hydrocarbons:
  - For companies: ZH 1/222
  - For employees: ZH 1/129issued by the German industrial liability insurance associations (central association for accident prevention and industrial medicine), Langwartweg 103, 53129 Bonn.

Continue: I12/2

---

## **SAFETY MEASURES**

Outside Germany, pay attention to appropriate local regulations.

Skin protection:

To avoid skin irritation when handling oil and grease, apply hand cream before starting work and wash cream off when finished with soap and water.

Continue: I01/1

## TESTERS, FIXTURES, TOOLS

### Testers, measuring instruments

Alternator tester:	0 684 201 200 (WPG 012.00)
Interturn short circuit tester:	0 986 619 110
Test prods: (old version)	0 986 619 101 0 986 619 114)
Universal measuring instrument MMD 302: or Electrical system tester:	0 984 500 302 0 684 101 400 (ETE 014.00)

Continue: Ii3/2

## TESTERS, FIXTURES, TOOLS

### Testers, measuring instruments

Dial gauge:	1 687 233 011
Magnetic measurement stand:	4 851 601 124 (T-M 1)
Two V-blocks:	comm. avail.

Continue: I14/1

## TESTERS, FIXTURES, TOOLS

### Tools, fixtures

Socket wrench:	0 986 618 152 (KDLJ 6030)
Disassembly tool:	0 986 619 396
M10 multi-point socket, long version:	comm. avail.
Support piece and pressing-in sleeve:	0 986 618 162 (KDLJ 6044)
Mandrel press:	comm. avail.

Continue: I14/2

---

## TESTERS, FIXTURES, TOOLS

### Tools, fixtures

Torque wrench:	comm. avail.
Supporting blocks for protective cap mount:	0 986 618 168 (KDLJ 6046)
Two-arm puller:	comm. avail.
Soldering iron 180 W:	comm. avail.
High-temperature solder (min. 480 C):	comm. avail.
Solder cream:	comm. avail.

Continue: I01/1

## TEST SPECIFICATIONS

### Mechanical test specifications

Diameter of collector rings

New:	15,6 mm
Min.:	14,9 mm

Max. radial run-out of  
collector rings:

0,03 mm

Max. radial run-out at  
rotor OD:

0,05 mm

Carbon brush projection at  
regulator

New:	12,5 mm
Min.:	5 mm

Continue: I15/2

## TEST SPECIFICATIONS

### Electrical test specifications

Suppression

capacitor: 2,0...2,4 microfarads

Stator resistance: < 0,1 Ohm

Rotor resistance

(14V version): 1,8...2,8 Ohm

Rotor resistances

(28V version)

NC R 28V 30-65A: 8,1...9,9 Ohm

NC R 28V 40-90A: 6,8...8,2 Ohm

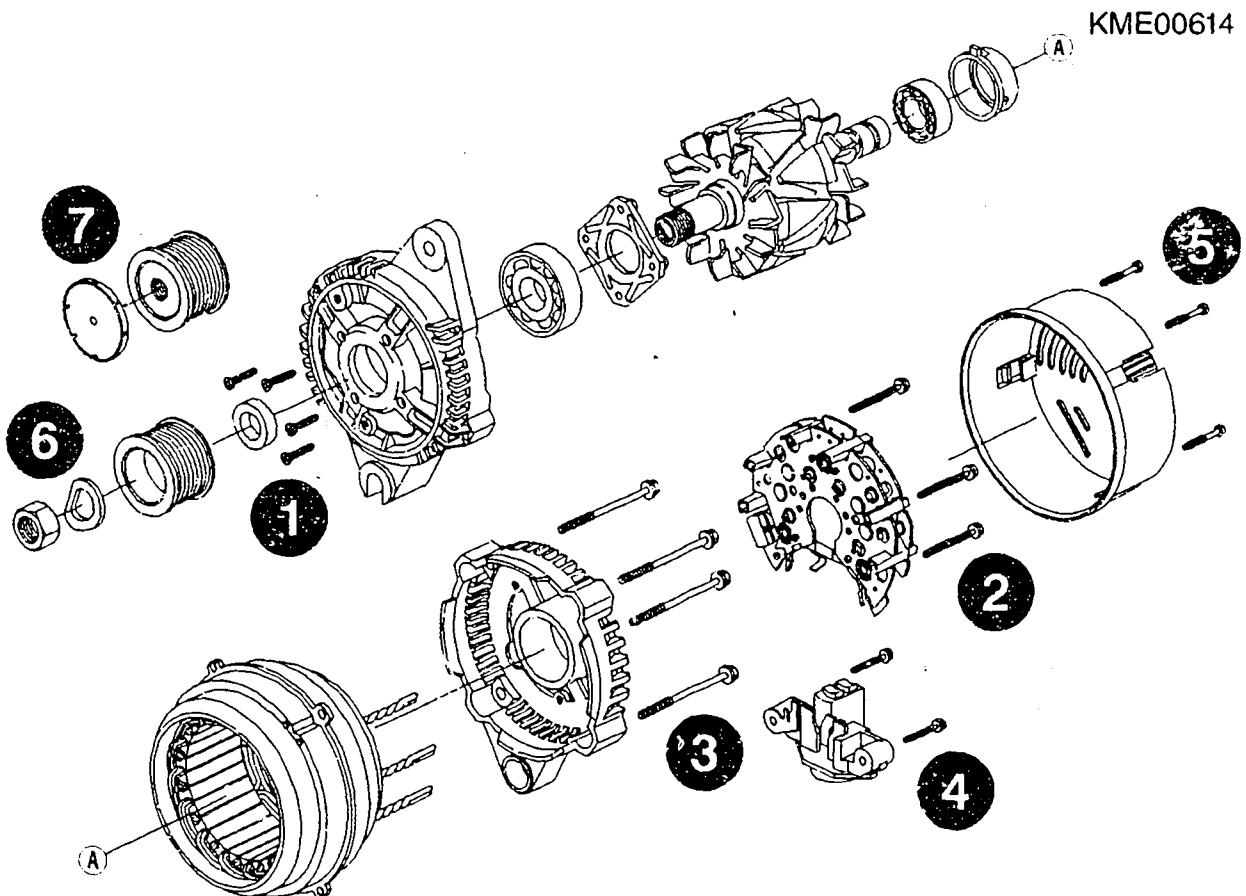
Continue: I01/1

## TIGHTENING TORQUES

Tightening torques for attachment of

1 = Cover plate:	2,7...3,5 Nm
2 = Rectifier unit:	3,5...4,3 Nm
3 = End shields:	4,5...5,5 Nm
4 = Regulator:	1,6...2,3 Nm
5 = Protective cap:	0,5...1,2 Nm
6 = Pulley:	60...70 Nm
7 = Free-wheel pulley:	75...85 Nm
Connection B+:	10 Nm
Connection D+:	7,8 Nm

Continue: I01/1 Fig.: I16/2



# CIRCUIT DIAGRAM

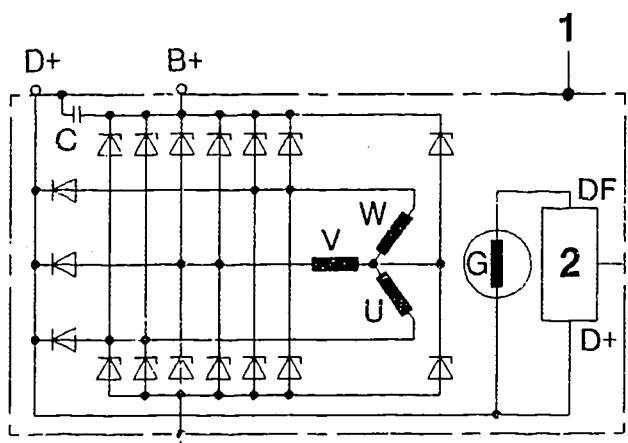
## Rectifier unit version 1

1 = Alternator

2 = Regulator

Continue: II8/1 Fig.: II7/2

KME00604



# CIRCUIT DIAGRAM

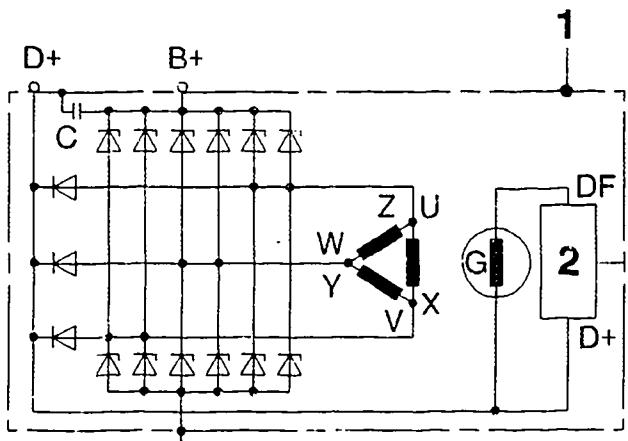
## Rectifier unit version 2

1 = Alternator

2 = Regulator

Continue: I19/1 Fig.: I18/2

KME00605



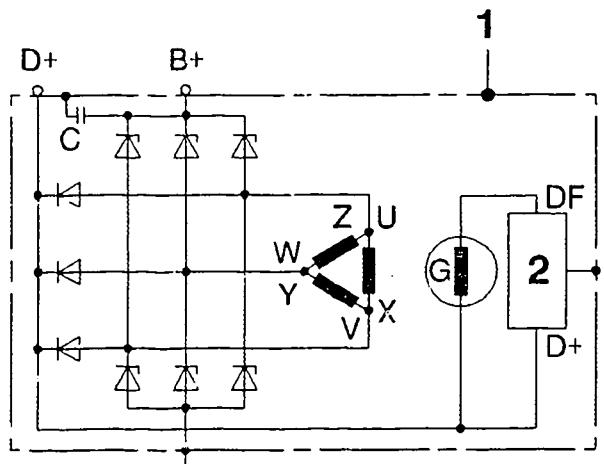
## CIRCUIT DIAGRAM

Rectifier unit version 3

1 = Alternator  
2 = Regulator

Continue: I20/1 Fig.: I19/2

KME00606



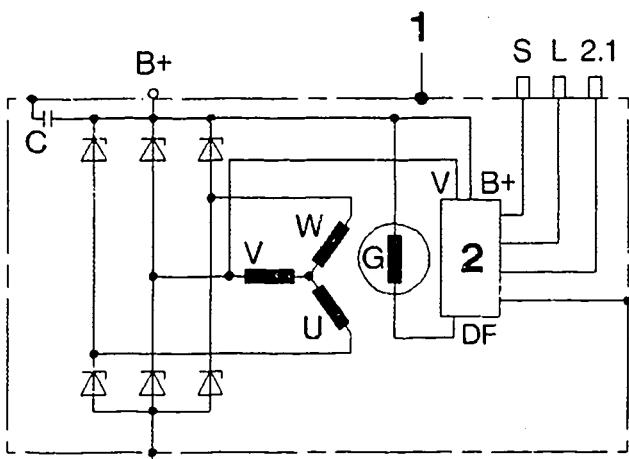
# CIRCUIT DIAGRAM

Rectifier unit version 4  
(with multifunction regulator)

1 = Alternator  
2 = Regulator

Continue: I21/1 Fig.: I20/2

KME00639



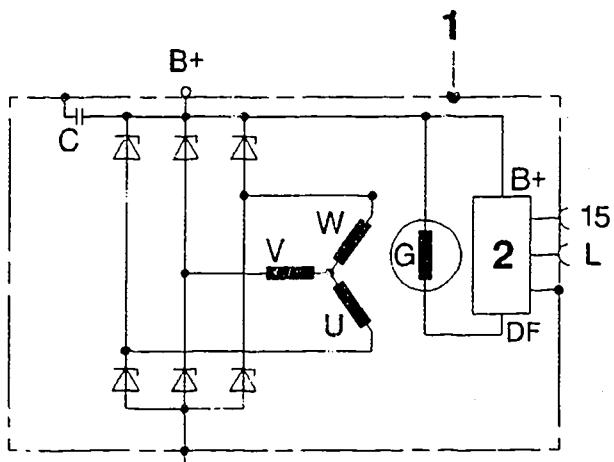
# CIRCUIT DIAGRAM

Rectifier unit version 5  
(with multifunction regulator)

1 = Alternator  
2 = Regulator

Continue: I22/1 Fig.: I21/2

KME00640



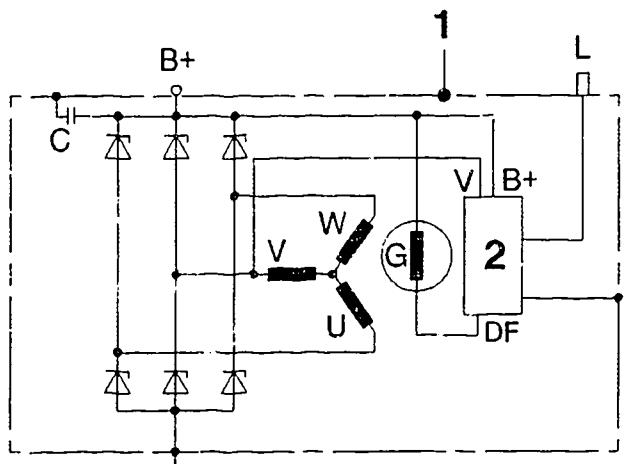
# CIRCUIT DIAGRAM

Rectifier unit version 6  
(with multifunction regulator)

1 = Alternator  
2 = Regulator

Continue: I23/1 Fig.: I22/2

KME00641



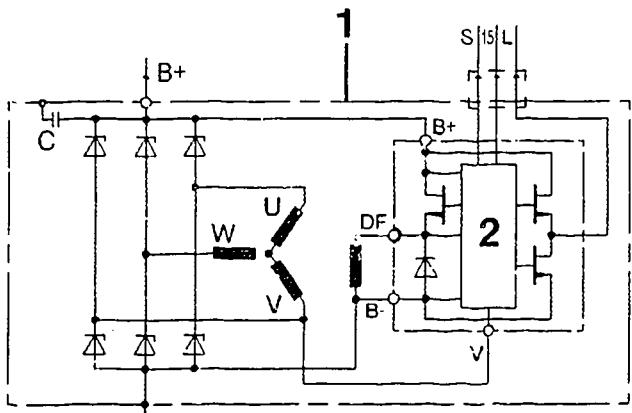
# CIRCUIT DIAGRAM

Rectifier unit version 7  
(28V)

1 = Alternator  
2 = Regulator

Continue: I24/1 Fig.: I23/2

KME00612



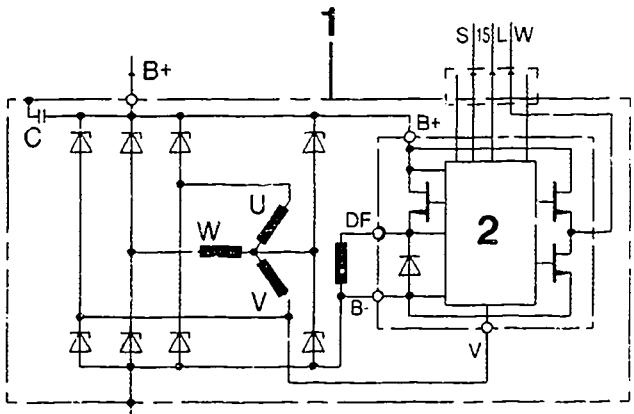
## CIRCUIT DIAGRAM

Rectifier unit version 8  
(28V)

1 = Alternator  
2 = Regulator

Continue: I01/1 Fig.: I24/2

KME006i3



## ALTERNATOR DISASSEMBLY/CHECKING TABLE

Disassembling pulley	I26/1
Disassembling protective cap	II02/1
Disassembling regulator	II05/1
Checking (installed) rectifier unit	II07/1
Checking (installed) stator	II09/1
Disassembling drive end shield	III0/1
Disassembling rotor	III2/1
Disassembling deep-groove ball bearing of drive end shield	III4/1

Continue: I25/2

## ALTERNATOR DISASSEMBLY/CHECKING TABLE

Disassembling deep-groove ball bearing of collector ring end shield	III17/1
Disassembling rectifier unit	III19/1
Disassembling stator	II23/1

Continue: I01/1

# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling pulley

Remove cap (1) of pulley (2).

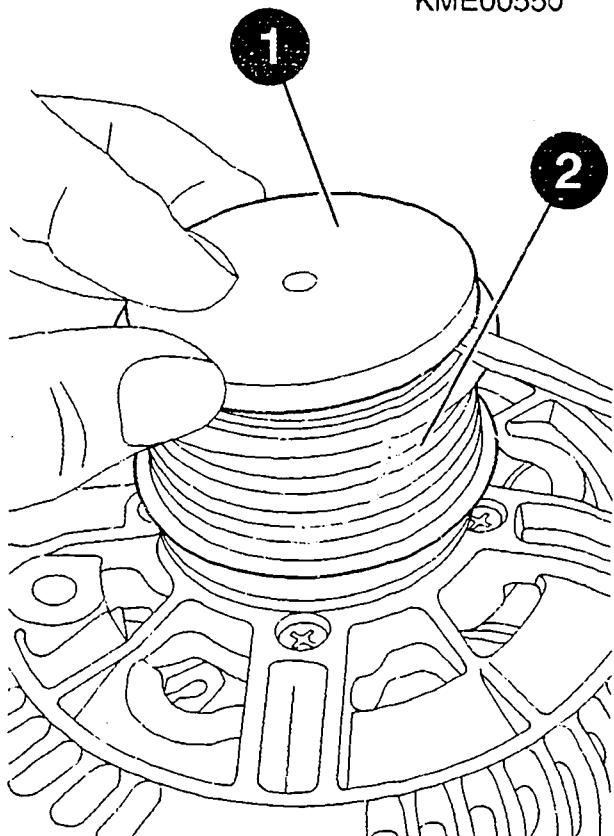
### NOTE:

Cap is either pressed in or clipped on.

Clip-on cap can be removed using a suitable tool.

Continue: I27/1 Fig.: I26/2

KME00550



## DISASSEMBLING AND CHECKING ALTERNATOR

### Disassembling pulley

Remove cap (1) of pulley (2).

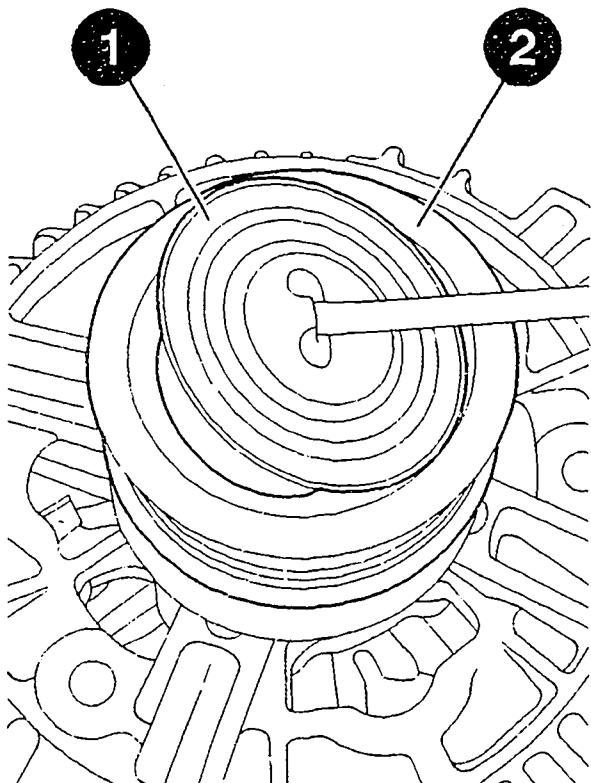
#### NOTE:

Cap is either pressed in or clipped on.

A pressed-in cap can only be removed by piercing it and prising it out.

Continue: I28/1 Fig.: I27/2

KME00551



## DISASSEMBLING AND CHECKING ALTERNATOR

### Disassembling pulley

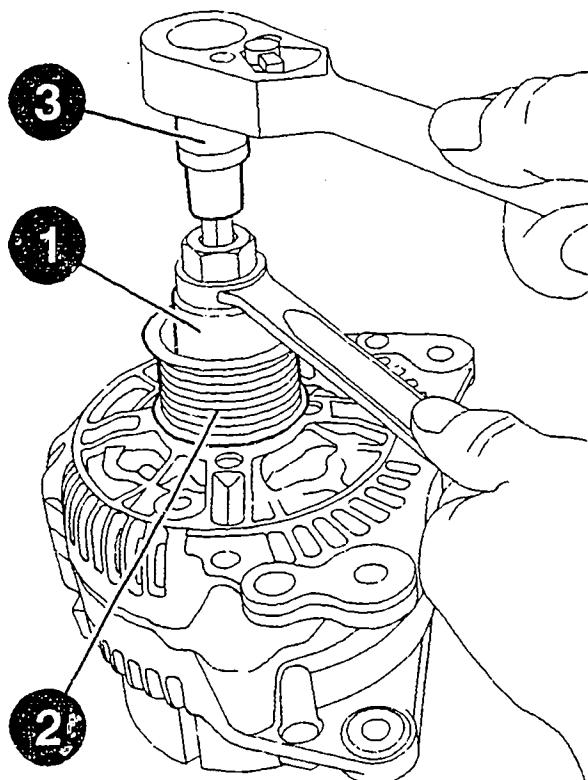
Attach socket wrench (1) to nut of pulley (2). Hold rotor shaft of alternator with multi-point wrench (3) and unfasten nut using 22 mm box wrench.

Detach pulley and spring lock washer.

Socket wrench:	0 986 618 152
M10 multi-point socket, long version:	comm. avail.

Continue: II01/1 Fig.: I28/2

KME00552



## DISASSEMBLING AND CHECKING ALTERNATOR

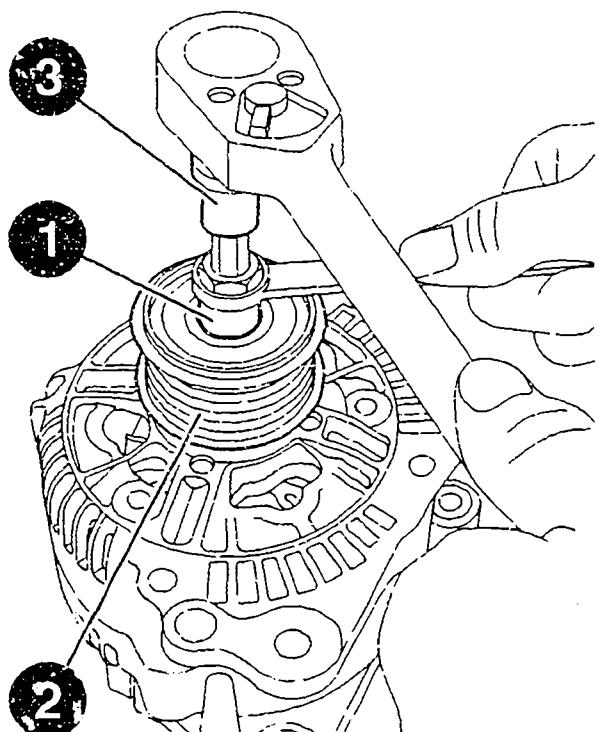
### Disassembling pulley (free-wheel pulley)

Insert disassembly tool (1) in grooved toothing of free-wheel pulley (2). Hold rotor shaft of alternator with multi-point wrench (3), unfasten free-wheel pulley by means of disassembly tool using 17 mm box wrench and detach.

Disassembly tool: 0 986 619 396  
M10 multi-point socket,  
long version: comm. avail.

Continue: I25/1 Fig.: II01/2

KME00553



## DISASSEMBLING AND CHECKING ALTERNATOR

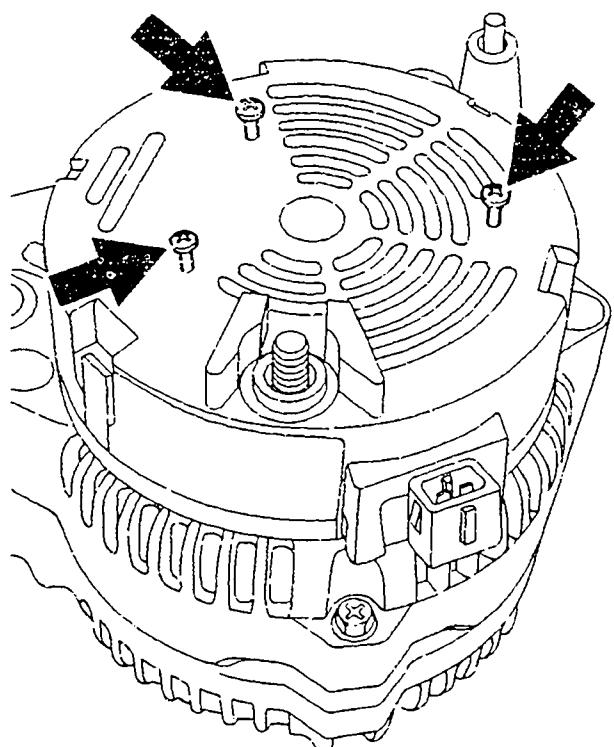
Disassembling protective cap

Unfasten connections B+, D+ and terminal W (if fitted).

Unscrew bolts (arrow) of protective cap.

Continue: II03/1 Fig.: II02/2

KME00554



## DISASSEMBLING AND CHECKING ALTERNATOR

### Disassembling protective cap

Detachment of protective cap involves inserting two supporting blocks (1) in the openings of the protective cap fastener (clips).

Bend (2) third clip outwards slightly by hand.

#### NOTE:

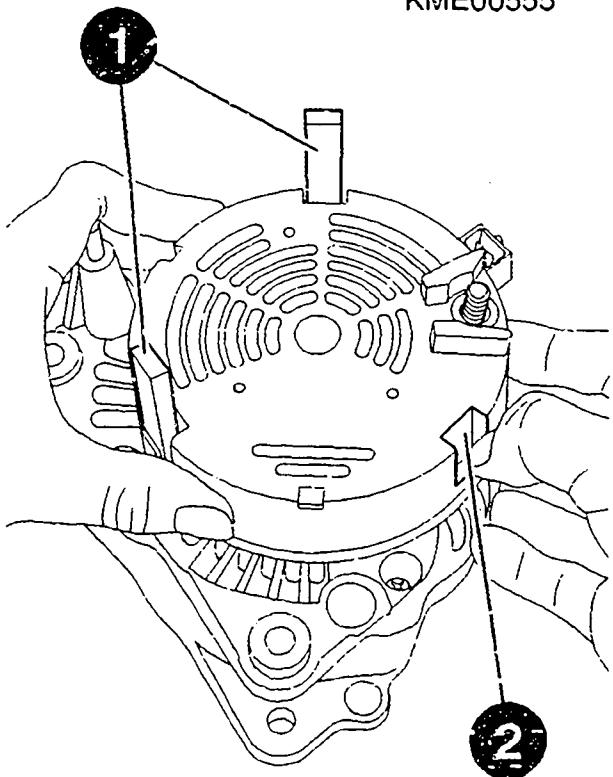
Take care not to bend clips too far to avoid breakage.

Supporting blocks:

0 986 618 168

Continue: II04/1 Fig.: II03/2

KME00555

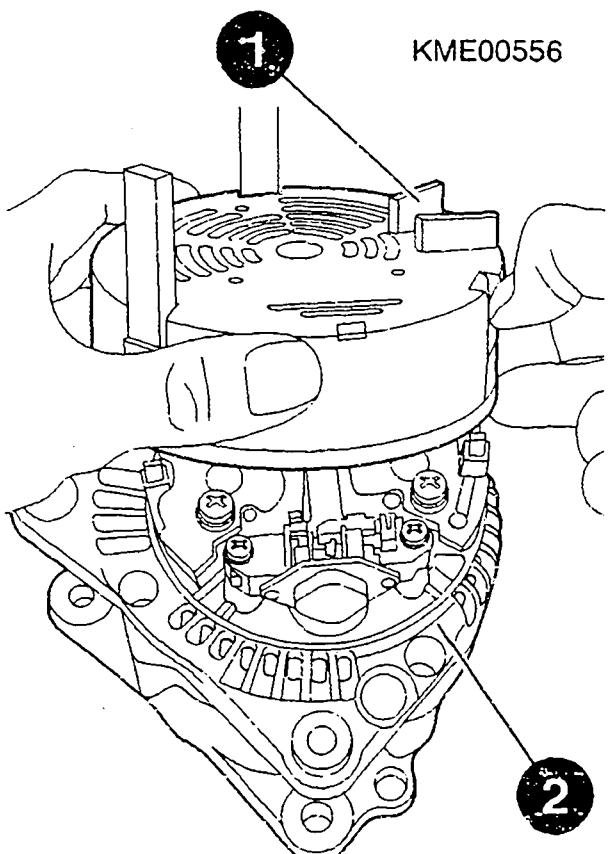


## DISASSEMBLING AND CHECKING ALTERNATOR

### Disassembling protective cap

Detach protective cap (1) from collector ring end shield and rectifier unit (2).

Continue: I25/1 Fig.: II04/2



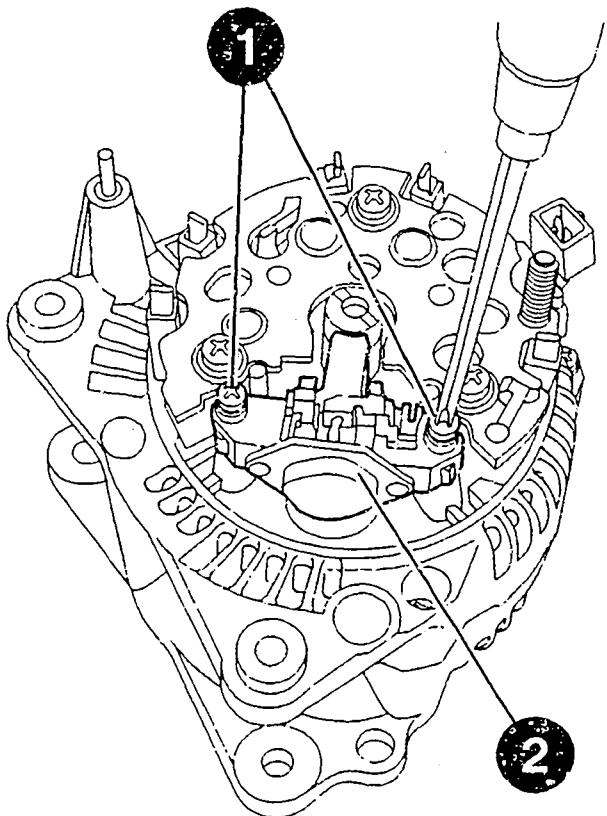
# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling regulator

Unfasten and remove bolts (1) of regulator (2).

Continue: II06/1 Fig.: II05/2

KME00557



# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling regulator

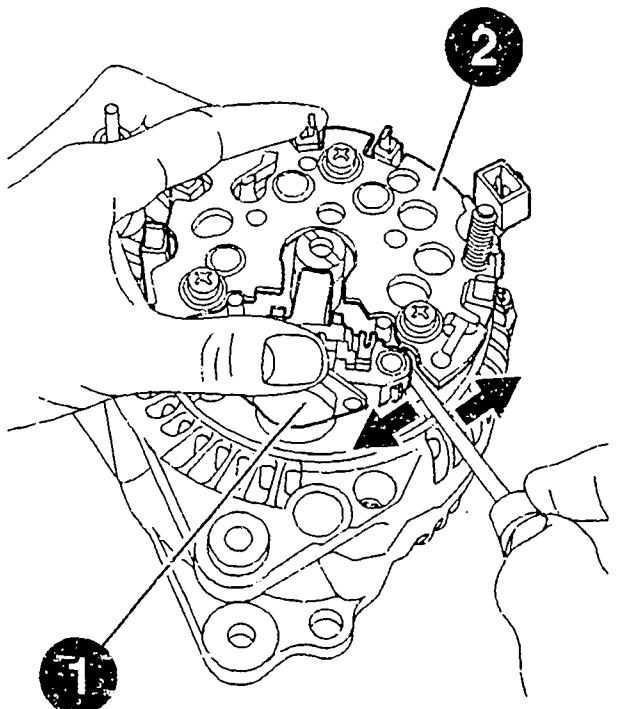
If necessary, use screwdriver to unclip regulator (1) outwards from rectifier unit (2) and detach.

### ATTENTION:

Take care not to damage carbon brushes when doing so.

Continue: I25/1 Fig.: II06/2

KME00558



## **DISMANTLING AND CHECKING ALTERNATOR**

### **Checking (installed) rectifier**

#### **GENERAL:**

- \* Pointer of measuring instrument must be in green band for this test.
- \* Renew entire rectifier if one or more diodes defective.

**Continue: II07/2**

---

## **DISMANTLING AND CHECKING ALTERNATOR**

- \* To ensure proper functioning of rectifier, alternator is to be checked on test bench or diodes checked individually with rectifier removed.

**Continue: II08/1**

## DISASSEMBLING AND CHECKING ALTERNATOR

### Checking (installed) rectifier unit

Check function of rectifier unit when connected to alternator tester. Pay attention to switch setting "ASSEMBLY" on tester.

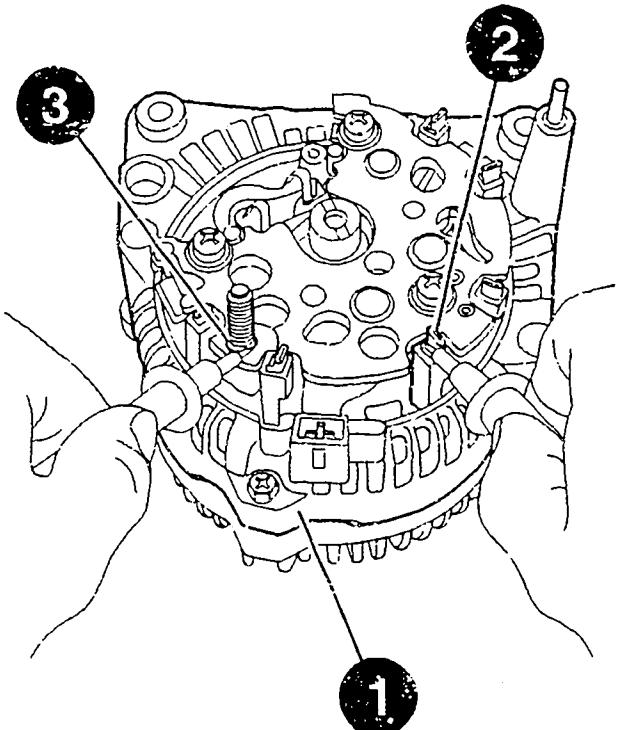
Measurement points between:

- \* Housing (1) and stator connections (2)
- \* B+ (3) and stator connections

Alternator tester: 0 684 201 200

Continue: I25/1 Fig.: II08/2

KME00559



## DISASSEMBLING AND CHECKING ALTERNATOR

### Checking (installed) stator

Check resistance between the corresponding winding ends.

Pay attention to switch setting on alternator tester.

Heed measuring range on tester.

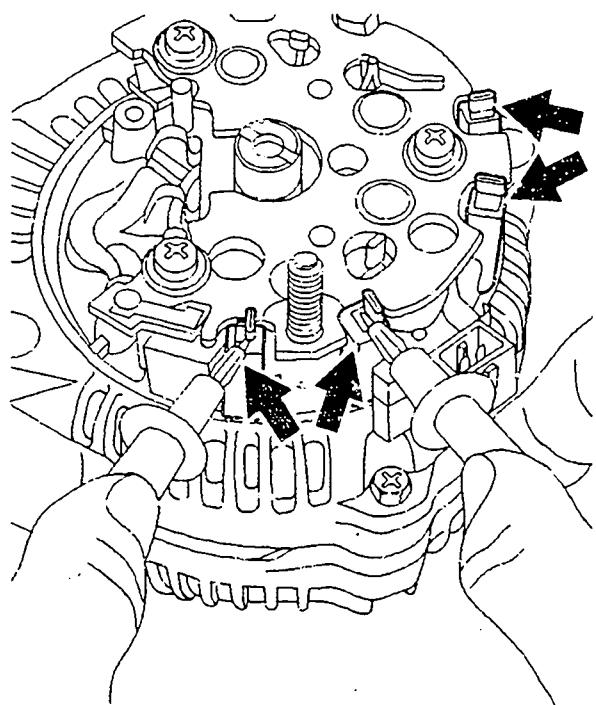
Stator resistance: < 0,1 Ohm

Alternator  
tester:

0 684 201 200

Continue: I25/1 Fig.: II09/2

KME00560



## DISASSEMBLING AND CHECKING ALTERNATOR

### Disassembling drive end shield

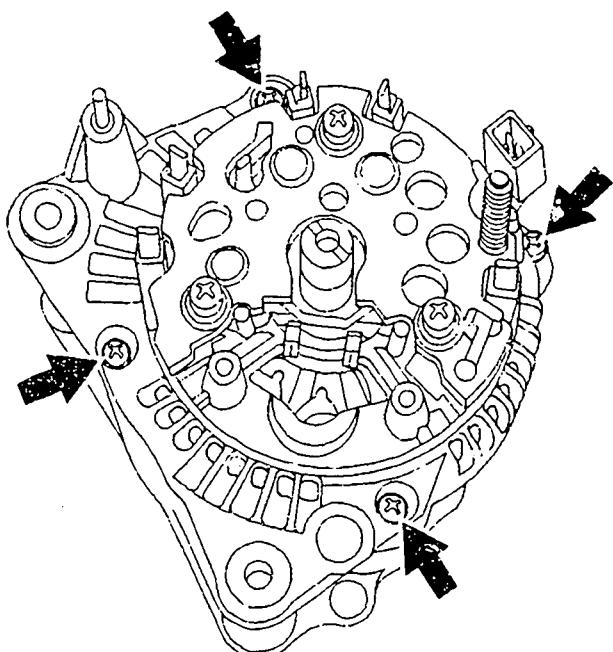
#### NOTE:

Prior to further disassembly of alternator, mark drive end shield and collector ring end shield to ensure that they are installed in the same position on assembly.

Unfasten and remove four hexagon bolts (arrow).

Continue: III1/1 Fig.: III0/2

KME00561



## DISASSEMBLING AND CHECKING ALTERNATOR

### Disassembling drive end shield

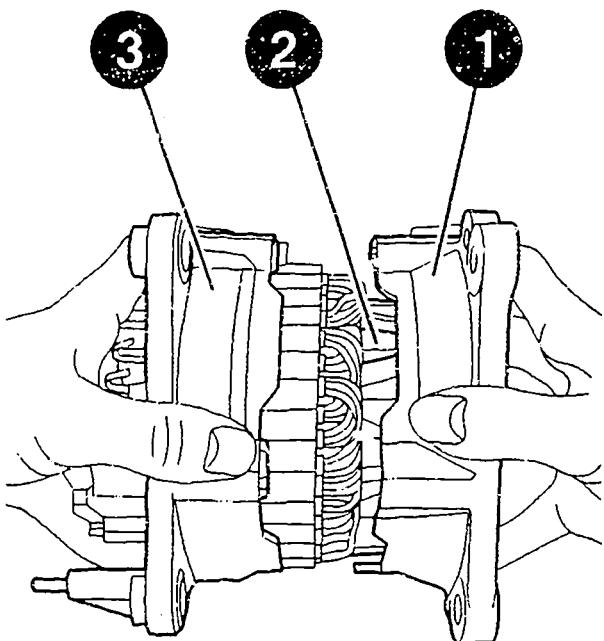
Pull drive end shield (1) with rotor (2) out of collector ring end shield (3).

#### NOTE:

If necessary, separate drive end shield and collector ring end shield by tapping carefully with rubber-headed hammer.

Continue: I25/1 Fig.: III/2

KME00562



## DISASSEMBLING AND CHECKING ALTERNATOR

### Disassembling rotor

Position collector ring end of drive end shield with rotor (1) in support piece (2).

Use extraction tool (3) to pull drive end shield off rotor.

#### NOTE:

When applying extraction tool, it may be necessary to fit a separate puller arm. Apply puller arms at bearing seat of drive end shield.

Take care not to damage fan blades.

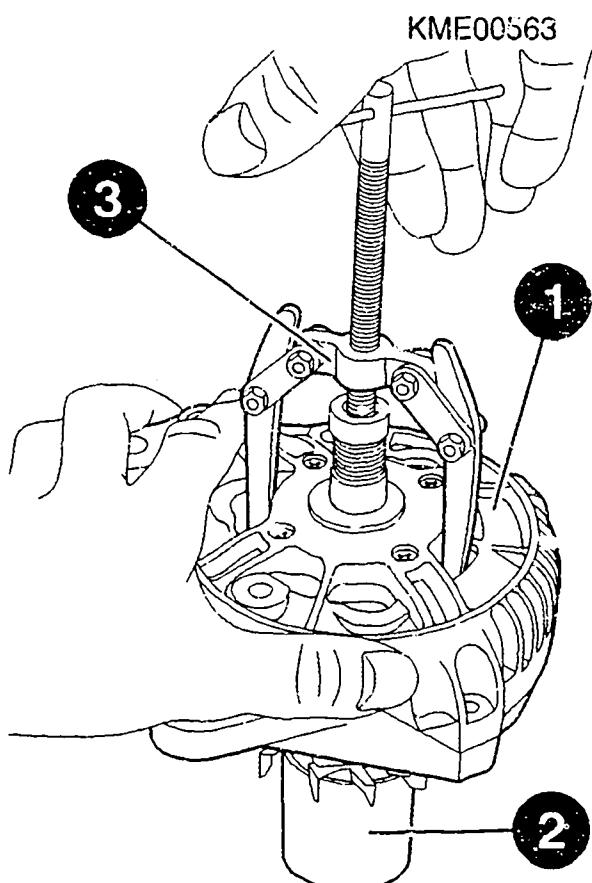
Support piece:

0 986 618 162

Extraction tool:

comm. avail.

Continue: III3/1 Fig.: III2/2



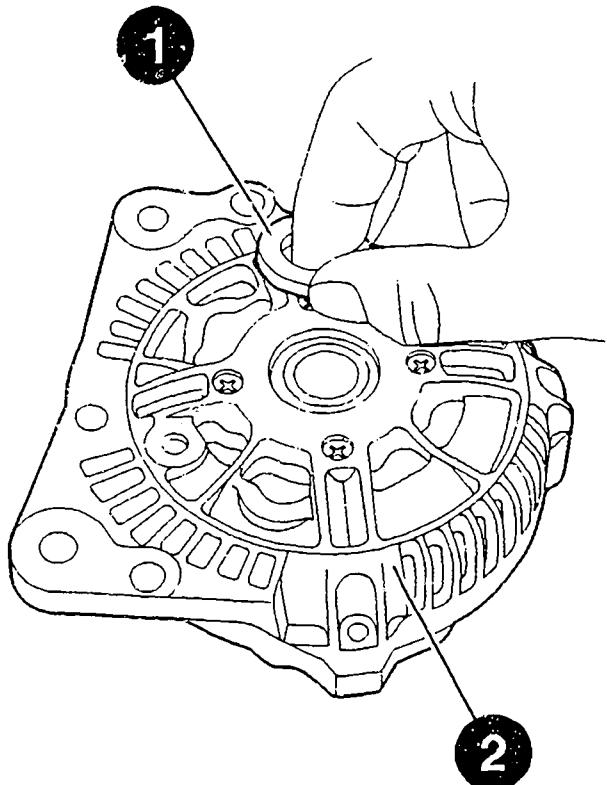
# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling rotor

Detach spacer ring (1) from drive end shield (2).

Continue: I25/1 Fig.: II13/2

KME00564



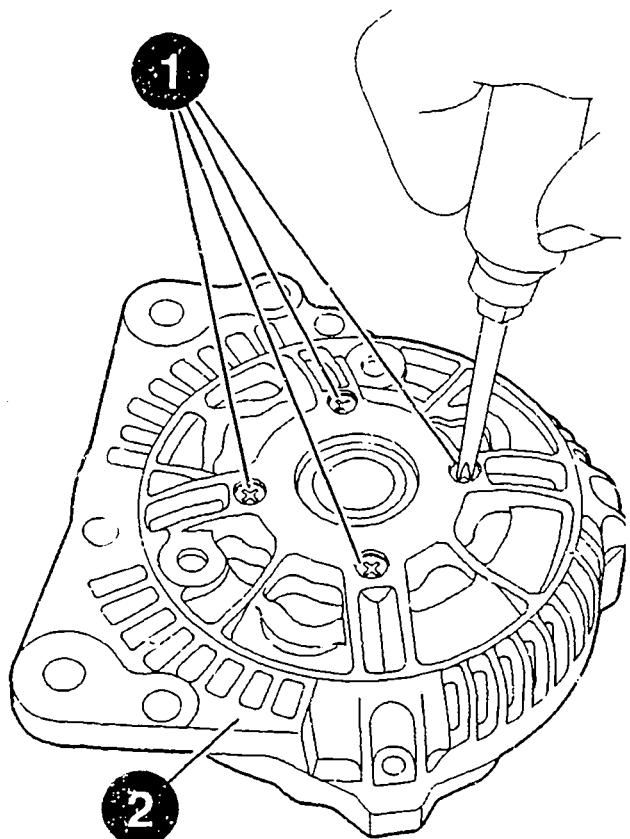
# DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling deep-groove ball bearing of drive end shield

Unfasten four bolts (1) of drive end shield (2).

Continue: II15/1 Fig.: II14/2

KME00565



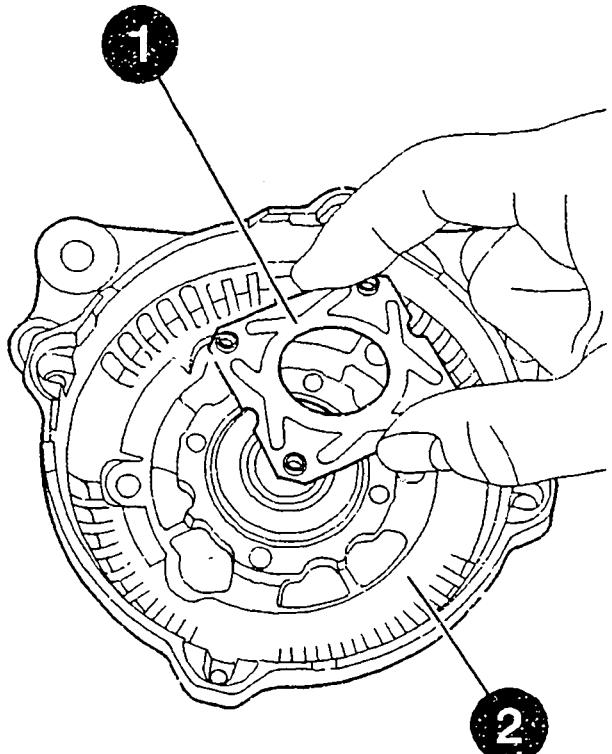
## DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling deep-groove ball bearing of drive end shield

Detach cover plate (1) from drive end shield (2).

Continue: III6/1 Fig.: II15/2

KME00566



## DISASSEMBLING AND CHECKING ALTERNATOR

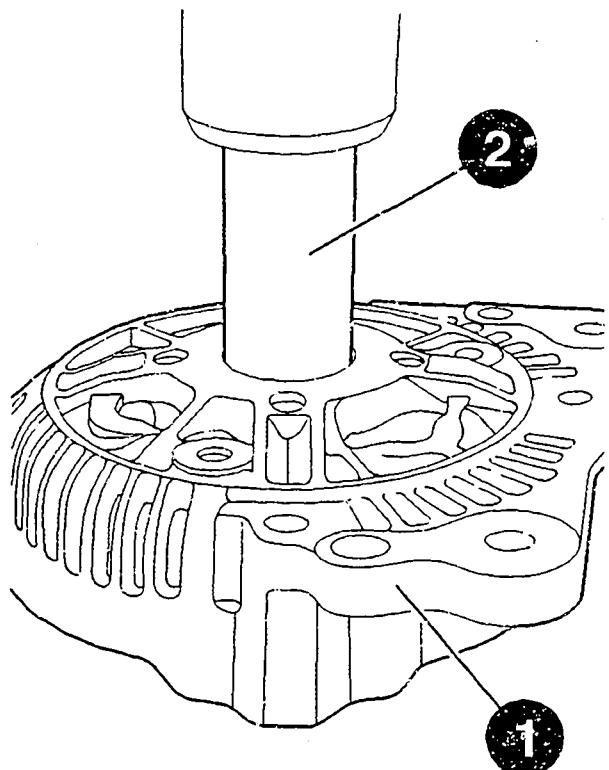
Disassembling deep-groove ball bearing of drive end shield

Position drive end shield (1) on press and press deep-groove ball bearing with pressing-in sleeve (2) out of drive end shield.

Mandrel press: comm. avail.  
Pressing-in sleeve: 0 986 618 162

Continue: I25/1 Fig.: II16/2

KME00567



## DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling deep-groove ball bearing of collector ring end shield

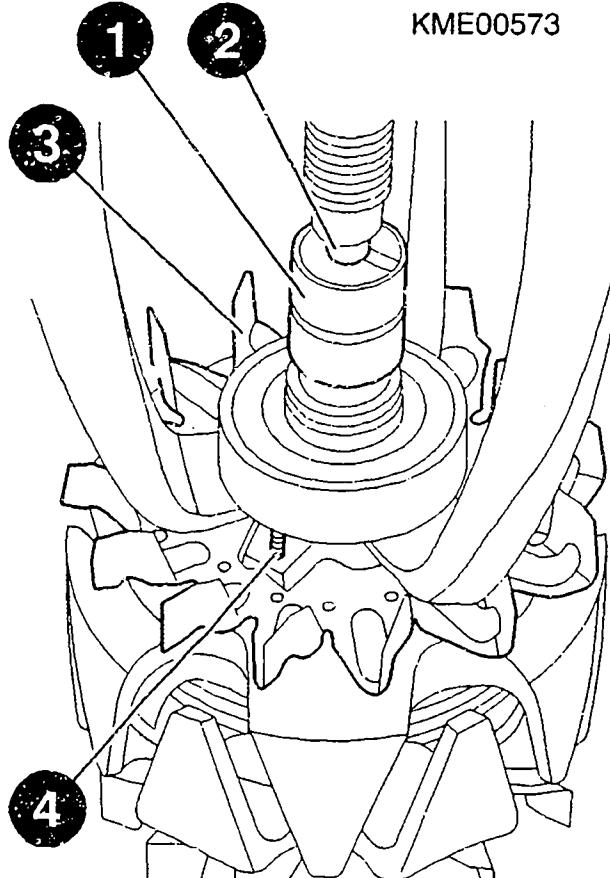
### ATTENTION:

So as to avoid breaking collector ring assembly (1), pressing-off mandrel (2) must be applied to rotor shaft and never to actual collector ring assembly.

When pulling off, take care not to damage fan blades (3) and electrical connections (4) by turning claws of extraction tool.

Continue: III8/1 Fig.: III7/2

KME00573



## DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling deep-groove ball bearing of collector ring end shield

Position drive end of rotor (1) in support piece (2).

Use extraction tool (3) to pull deep-groove ball bearing (4) off rotor shaft.

Support piece:

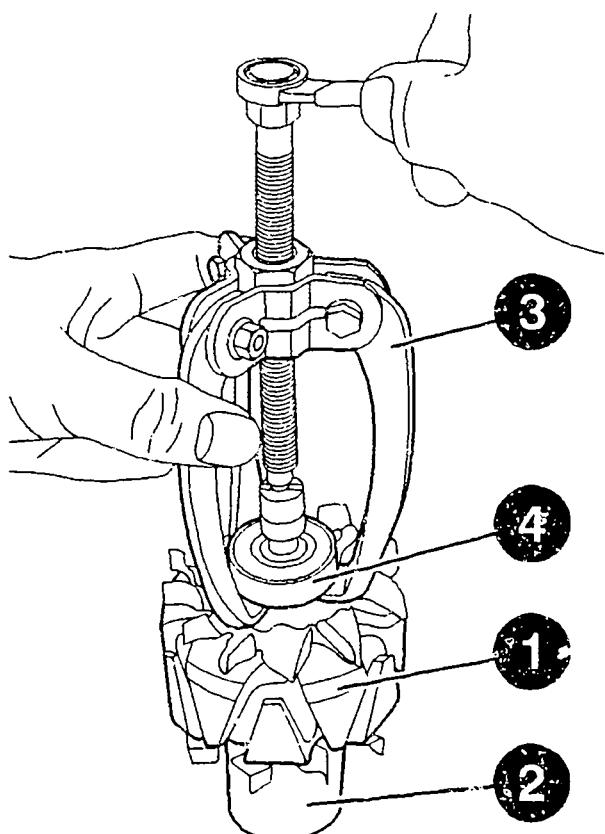
0 986 618 162

Extraction tool:

comm. avail.

Continue: I25/2 Fig.: II18/2

KME00568



# **DISASSEMBLING AND CHECKING ALTERNATOR**

## **Disassembling rectifier unit**

### **NOTE:**

If checking with oscilloscope reveals that rectifier unit is OK, it is not necessary to separate rectifier unit/stator.

**Continue: II20/1**

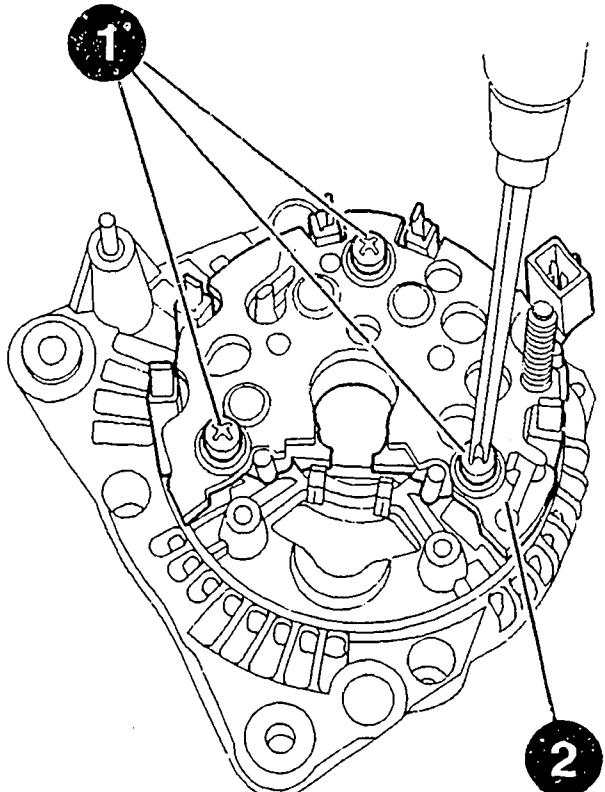
## DISASSEMBLING AND CHECKING ALTERNATOR

Disassembling rectifier unit

Remove bolts (1) of rectifier unit (2).

Continue: II21/1 Fig.: II20/2

KMEC0569



# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling rectifier unit

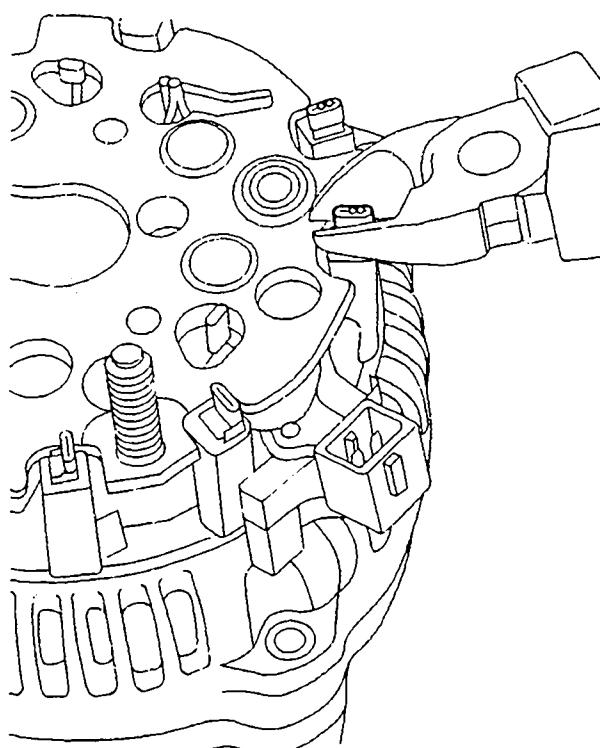
Use suitable tool e.g. side-cutting pliers to pinch off all stator wire holders directly beneath clamping point.

### NOTE:

Second lower clamping point of stator wire holders is used for rectifier unit assembly.

Continue: II22/1 Fig.: II21/2

KME00570



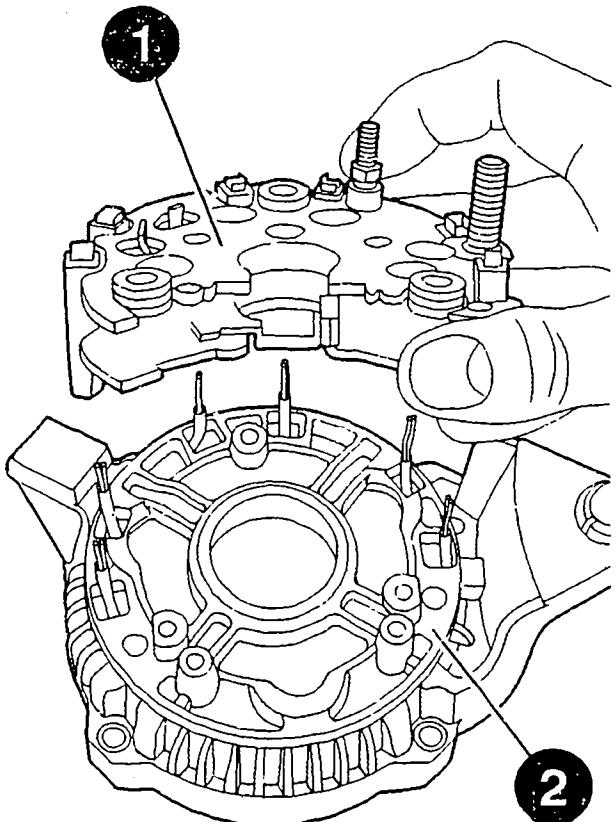
# DISASSEMBLING AND CHECKING ALTERNATOR

## Disassembling rectifier unit

Detach rectifier unit (1) from collector ring end shield (2).

Continue: I25/2 Fig.: II22/2

KME00571



## DISASSEMBLING AND CHECKING ALTERNATOR

### Disassembling stator

Mark position of stator (1) with respect to collector ring end shield (2).

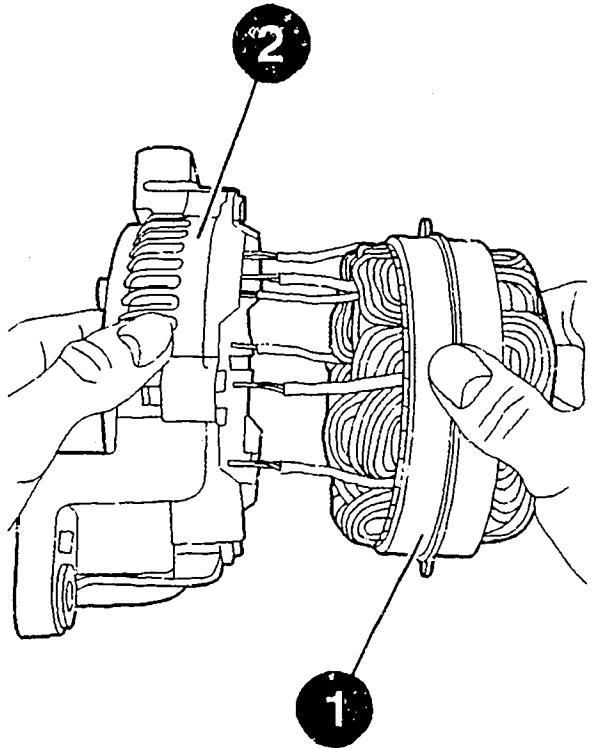
Pull stator out of collector ring end shield.

#### NOTE:

If necessary, separate stator and collector ring end shield by tapping carefully with rubber-headed hammer.

Continue: I01/1 Fig.: II23/2

KME00572



## **COMPONENT CLEANING**

### **ATTENTION: DANGER OF FIRE**

For transmitter and receiver interference suppression purposes, alternators are fitted with capacitors with a long storage time.

When washing out alternator components, immersion in cleaning fluid may result in capacitor discharge and cause flammable liquids to ignite.

Continue: II24/2

---

## **COMPONENT CLEANING**

For this reason, components with capacitors are only to be washed out using cleaning agents (e.g. HAKU 1025/6) which are not readily flammable.

Continue: II25/1

## **COMPONENT CLEANING**

**Always heed the following safety regulations:**

- \* German Order governing the use of flammable liquids (VbF).
- \* Accident prevention regulations for electrical systems and equipment.
- \* Safety regulations for the handling of chlorinated hydrocarbons:
  - For companies: ZH 1/222
  - For employees: ZH 1/129issued by the German industrial liability insurance associations (central association for accident prevention and industrial medicine), Langwartweg 103, 53129 Bonn.

**Continue: II25/2**

---

## **COMPONENT CLEANING**

**Outside Germany, pay attention to appropriate local regulations.**

**Skin protection:**

To avoid skin irritation when handling oil and grease, apply hand cream before starting work and wash cream off when finished with soap and water.

**Continue: I01/1**

## ALTERNATOR CHECKING/REPAIR TABLE

Checking regulator and carbon brushes	II27/1
Checking (removed) rectifier unit	II28/1
Checking interference suppression capacitor	III02/1
Checking (removed) stator	III04/2
Checking rotor (short to ground)	III06/1
Checking rotor (resistance)	III08/1
Checking rotor (concentricity)	III09/1
Replacing fitting ring in collector ring end shield	III11/1

Continue: I01/1

# CHECKING AND REPAIRING ALTERNATOR

## Checking regulator and carbon brushes

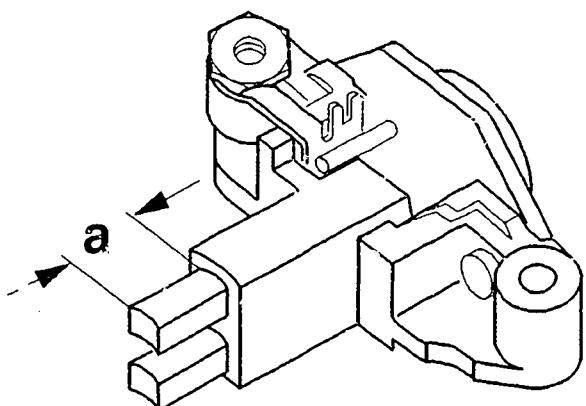
Check regulator for external damage.  
Replace regulator/carbon brushes if  
carbon brushes have broken off or if  
projection "a" is less than 5 mm.  
Check freedom of movement of carbon  
brushes.

## Projection of carbon brushes

New:	12,5 mm
Min.:	5 mm

Continue: II26/1 Fig.: II27/2

KME00164



## CHECKING AND REPAIRING ALTERNATOR

Checking (removed) rectifier unit

### GENERAL:

- \* Checking of the individual diodes must be performed to ensure proper functioning of the rectifier unit.
- \* The diodes are to be checked in both forward and reverse direction.

Continue: II28/2

---

## CHECKING AND REPAIRING ALTERNATOR

- \* Pointer of measuring instrument must be in green zone when checking in forward direction.
- \* Pointer of measuring instrument must be in red zone when checking in reverse direction.

Continue: III01/1

# CHECKING AND REPAIRING ALTERNATOR

## Checking (removed) rectifier

Render measurement points mechanically bright.

Heed general notes.

Check function of rectifier unit with alternator tester. Pay attention to switch setting "INDIVIDUAL CHECK" on tester.

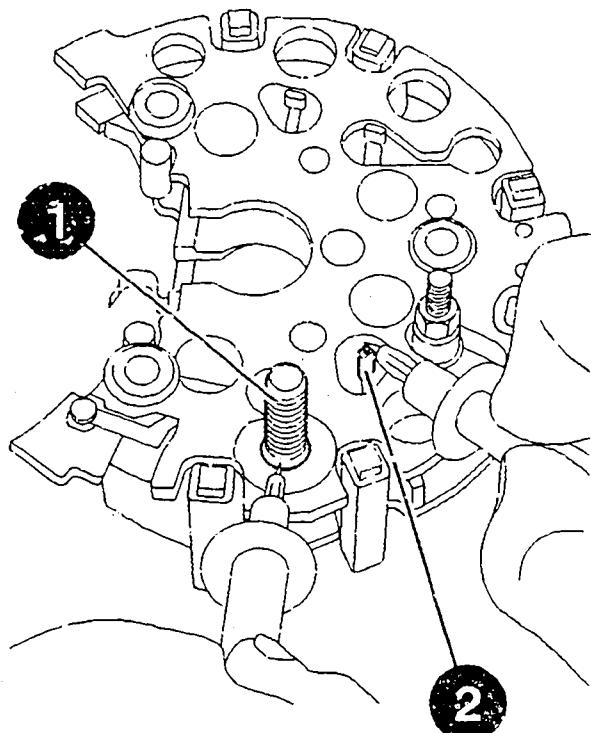
Measurement points between:

- \* B+ (1) and diode connections (2)
- \* Diode housing and diode connections

Alternator tester: 0 684 201 200

Continue: II26/1 Fig.: III01/2

KMEC0574



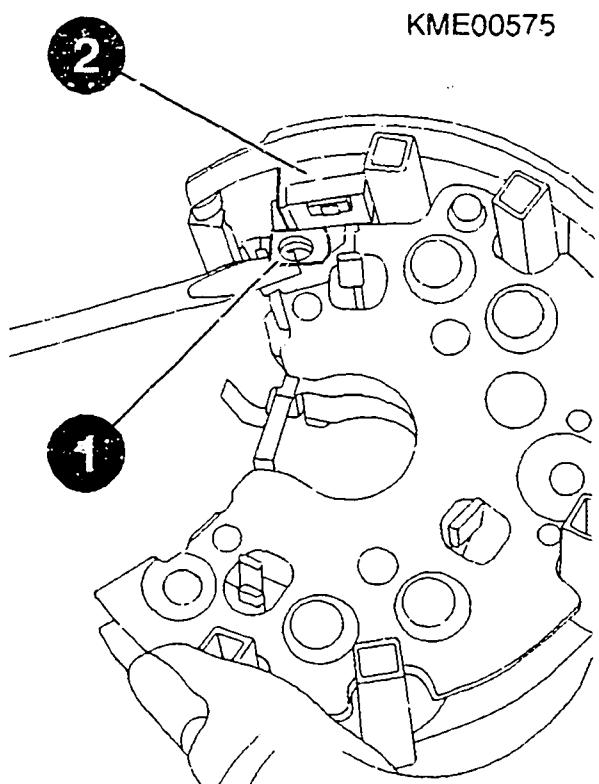
# CHECKING AND REPAIRING ALTERNATOR

## Checking interference suppression capacitor

Detach terminal lug B- (1) of interference suppression capacitor (2) from rectifier unit.

Continue: III03/1 Fig.: III02/2

KME00575



# CHECKING AND REPAIRING ALTERNATOR

Checking interference suppression capacitor

Measure capacitance of capacitor between B+ (1) and terminal lug (2).

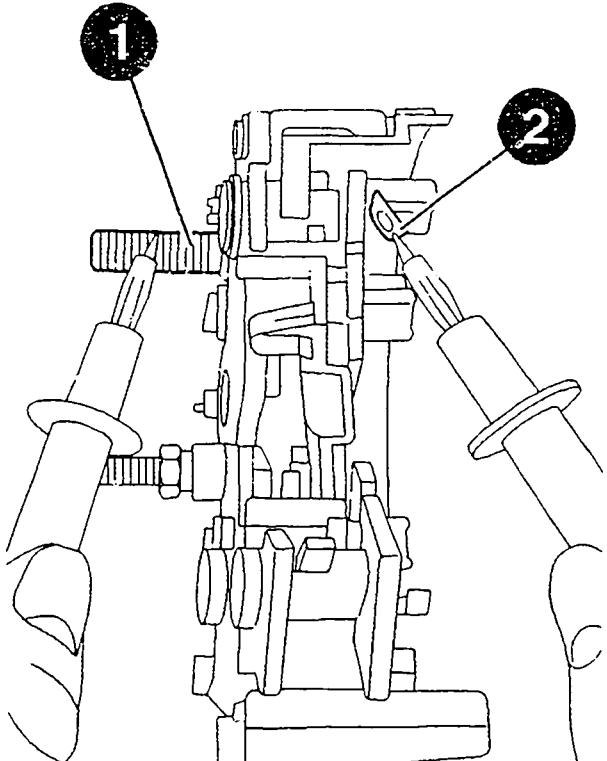
Renew defective rectifier unit if set value is not attained.

Set value: 2,0...2,4 microfarads

Electrical system tester: 0 684 101 400

Continue: III04/1 Fig.: III03/2

KME00576



## CHECKING AND REPAIRING ALTERNATOR

Checking interference suppression capacitor

### ATTENTION:

After checking, short and discharge interference suppression capacitor to prevent ignition of cleaning fluid when cleaning components.

Continue: II26/1

## CHECKING AND REPLACING ALTERNATOR

Checking (removed) stator

### ATTENTION:

Voltages of 80 V are POTENTIALLY FATAL.

When performing this check, it is imperative to ensure proper handling of the stator and all parts in electrical contact with it.

Continue: III05/1

# CHECKING AND REPAIRING ALTERNATOR

## Checking (removed) stator

Use test prods (1) to check stator for short to ground between housing (2) and winding ends (3).

Replace stator if defective.

Test voltage: 80 V AC

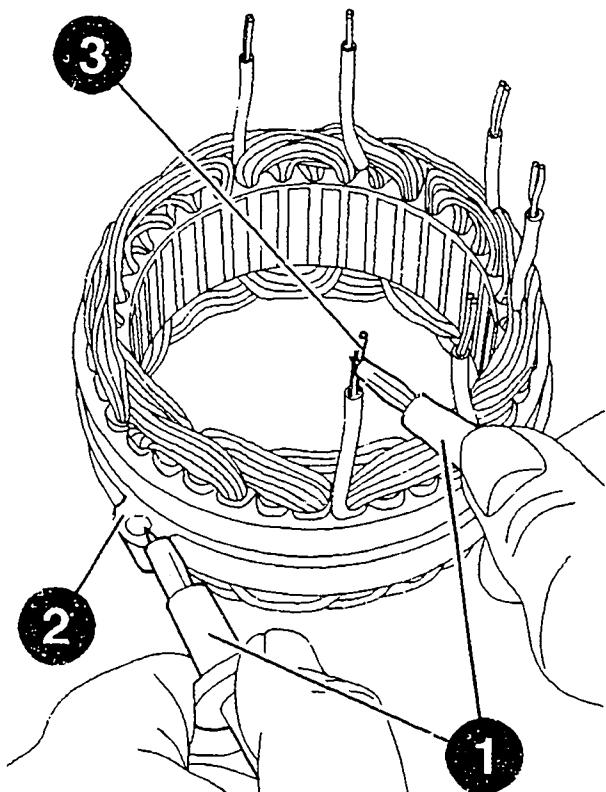
Interturn short-circuit

tester: 0 986 619 110

Test prods: 0 986 619 101

Continue: II26/1 Fig.: III05/2

KME00577



## CHECKING AND REPLACING ALTERNATOR

Checking rotor (short to ground)

### ATTENTION:

Voltages of 80 V are POTENTIALLY FATAL.

When performing this check, it is imperative to ensure proper handling of the rotor and all parts in electrical contact with it.

Continue: III07/1

# CHECKING AND REPAIRING ALTERNATOR

## Checking rotor (short to ground)

Use interturn short-circuit tester and test prods to check rotor for short to ground between collector ring (1) and rotor OD (2).

Test voltage: 80 V AC

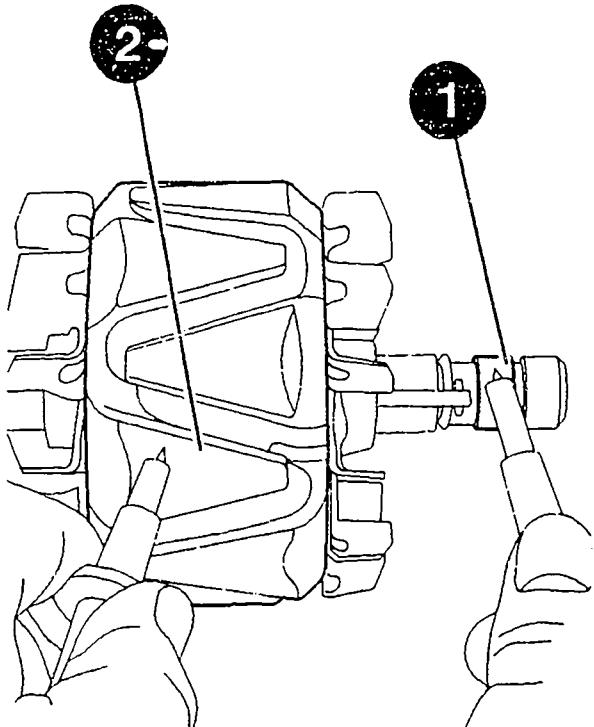
Interturn short-circuit

tester: 0 986 619 110

Test prods: 0 986 619 101

Continue: II26/1 Fig.: III07/2

KME00578



## CHECKING AND REPAIRING ALTERNATOR

### Checking rotor (resistance)

Use alternator tester to measure rotor resistance between collector rings.

Observe measuring range on tester.

#### Rotor resistance

(14V version): 1,8...2,8 Ohm

#### Rotor resistance

(28V version)

NC R 28V 30-65A: 8,1...9,9 Ohm

NC R 28V 40-90A: 6,8...8,2 Ohm

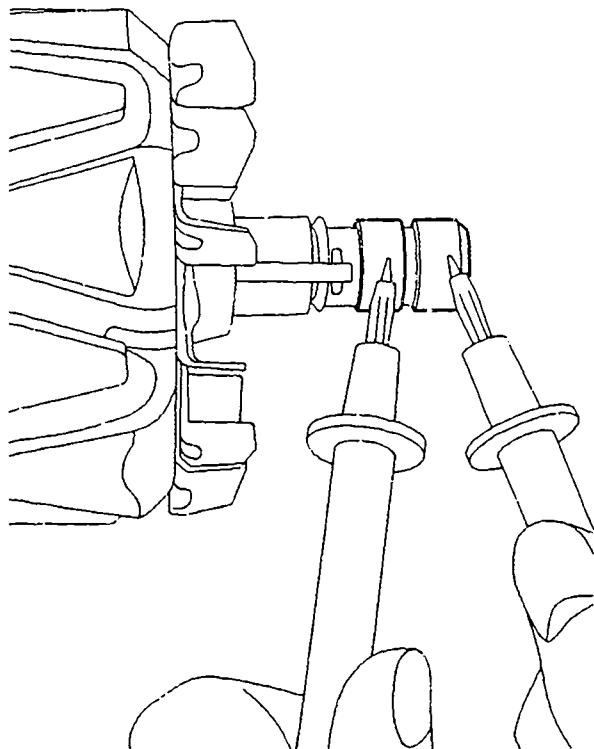
#### Alternator

tester:

0 684 201 200

Continue: II26/1 Fig.: III08/2

KME00579



# CHECKING AND REPAIRING ALTERNATOR

## Checking rotor (concentricity)

Position mounting points of rotor in V-blocks and perform precise horizontal alignment. Measure concentricity at OD of rotor with magnetic measurement stand and dial gauge.

Max. radial run-out at  
rotor OD:

0,05 mm

Two V-blocks:

comm. avail.

Dial gauge:

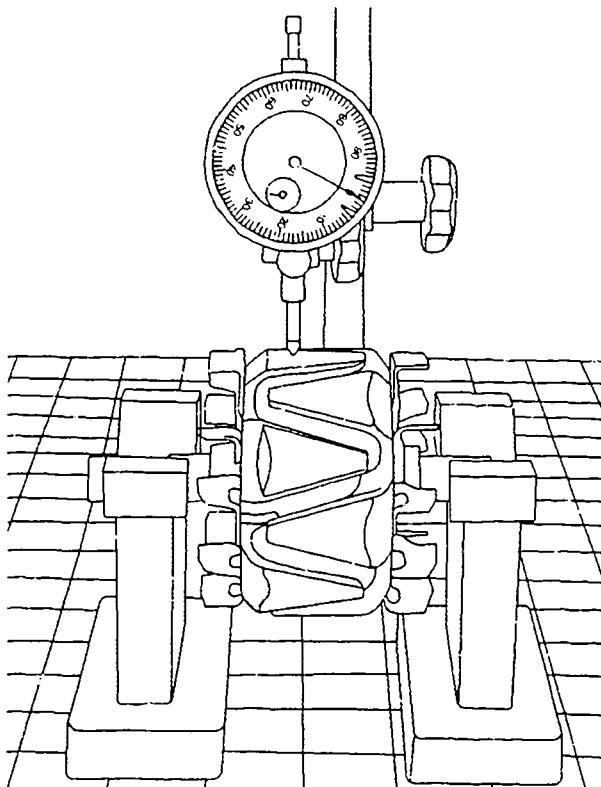
1 687 233 011

Magnetic measurement  
stand:

4 851 601 124

Continue: III10/1 Fig.: III09/2

KME00580



# CHECKING AND REPAIRING ALTERNATOR

## Checking rotor (concentricity)

Measure concentricity at collector rings.

Max. radial run-out of collector rings: 0,03 mm

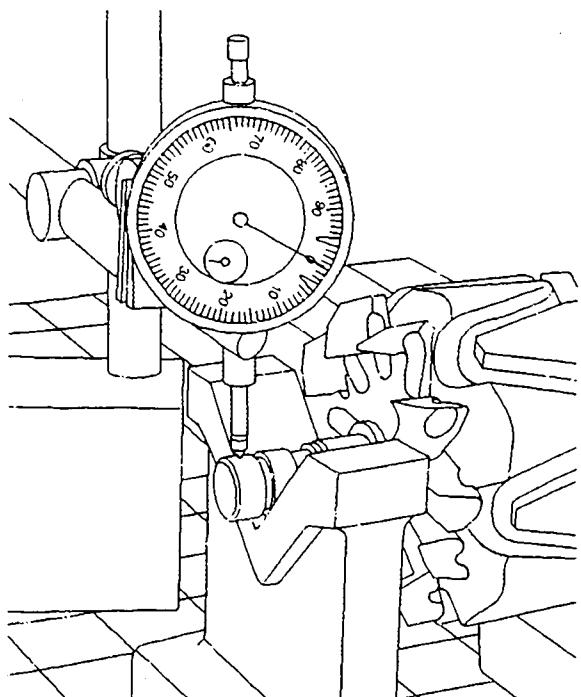
In the event of greater deviation or worn surface, turn down collector rings or renew rotor.

Pay attention to minimum diameter.

Min. diameter of collector rings: 14,9 mm

Continue: II26/1 Fig.: III10/2

KME00581



## CHECKING AND REPAIRING ALTERNATOR

Replacing fitting ring in collector ring end shield

Fitting ring is always to be replaced.

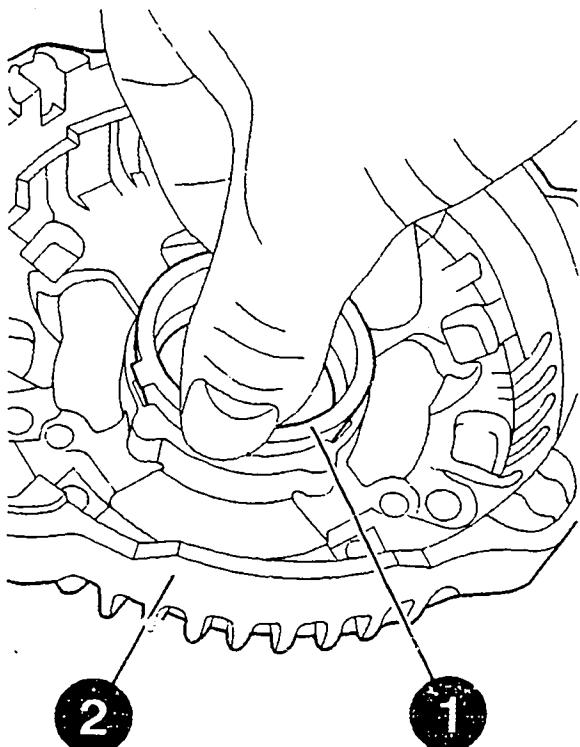
Insert new fitting ring (1) in collector ring end shield (2).

### NOTE:

In the case of fitting rings with collector ring protection, recess for carbon brushes must be located between the two tapped holes for regulator attachment.

Continue: I01/1 Fig.: IIII1/2

KME00582



## ALTERNATOR ASSEMBLY TABLE

Assembling deep-groove ball bearing of collector ring end shield	III13/1
Assembling deep-groove ball bearing of drive end shield	III15/1
Assembling rotor	III17/1
Assembling stator	III18/1
Assembling rectifier unit	III19/1
Assembling drive end shield and collector ring end shield	III23/1
Assembling regulator	III25/1
Assembling protective cap	III26/1
Assembling pulley	III28/1
Fitting connections	IV04/1

Continue: I01/1

## ASSEMBLING ALTERNATOR

### Assembling deep-groove ball bearing of collector ring end shield

Use is always to be made of a new  
deep-groove ball bearing.

Mount drive end of rotor (1) on  
support piece (2).

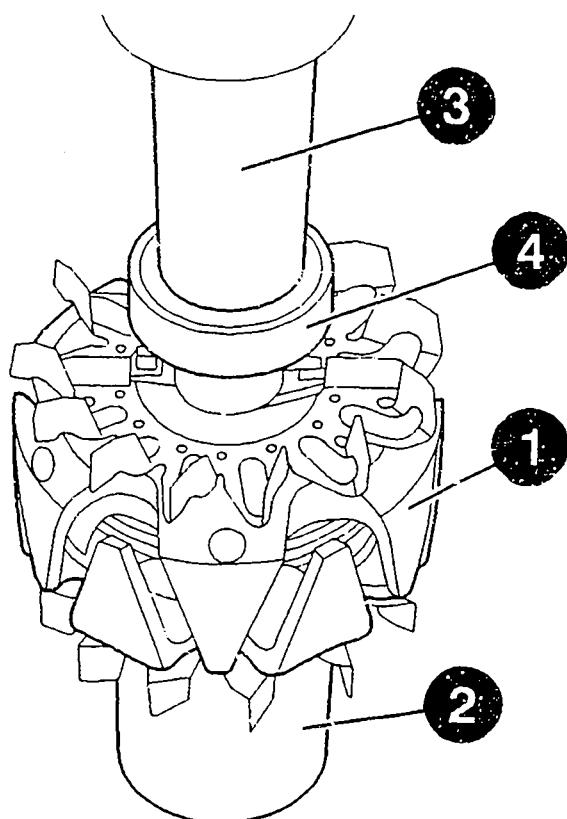
Centrally align pressing-in sleeve (3)  
with new deep-groove ball bearing (4).

#### ATTENTION:

Failure to center pressing-in sleeve  
may result in damage to collector  
ring assembly.

Continue: III14/1 Fig.: III13/2

KME00583



## ASSEMBLING ALTERNATOR

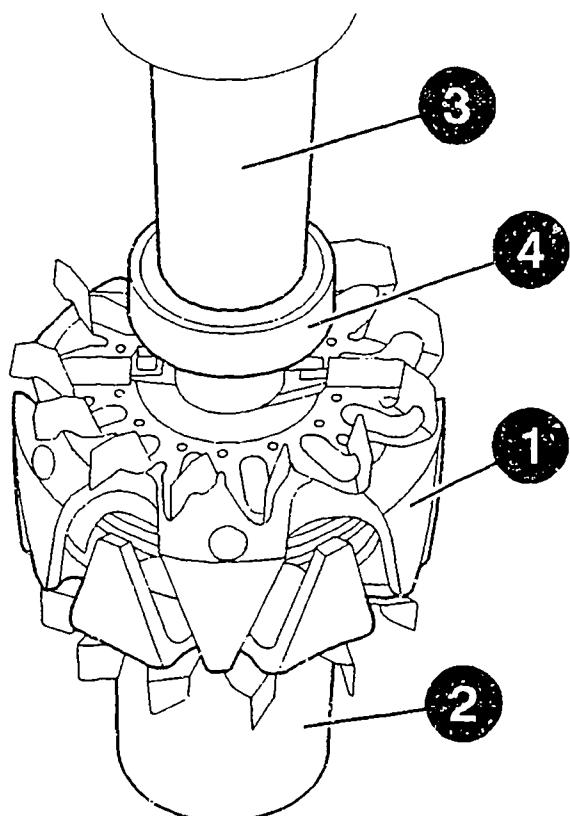
Assembling deep-groove ball bearing  
of collector ring end shield

Press home deep-groove ball bearing.

Mandrel press: comm. avail.  
Support piece and  
pressing-in sleeve: 0 986 618 162

Continue: III12/1 Fig.: III14/2

KME00583



## ASSEMBLING ALTERNATOR

### Assembling deep-groove ball bearing of drive end shield

Use is always to be made of a new deep-groove ball bearing, new bolts and a new cover plate.

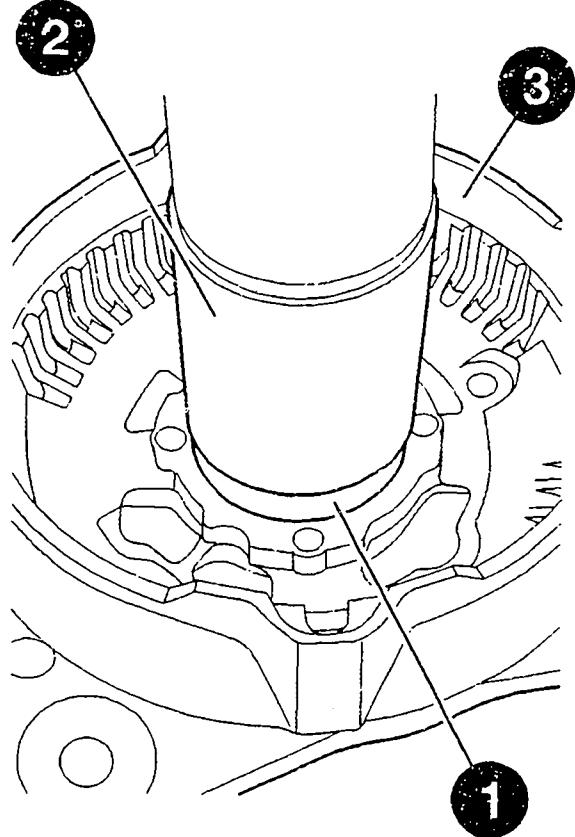
Press new deep-groove ball bearing (1) with support piece (2) into drive end shield (3).

Support piece:  
Mandrel press:

0 986 618 162  
comm. avail.

Continue: III16/1 Fig.: III15/2

KME00584



## ASSEMBLING ALTERNATOR

Assembling deep-groove ball bearing of drive end shield

Attach cover plate with four bolts (1) to drive end shield (2). Make use of torque wrench.

NOTE:

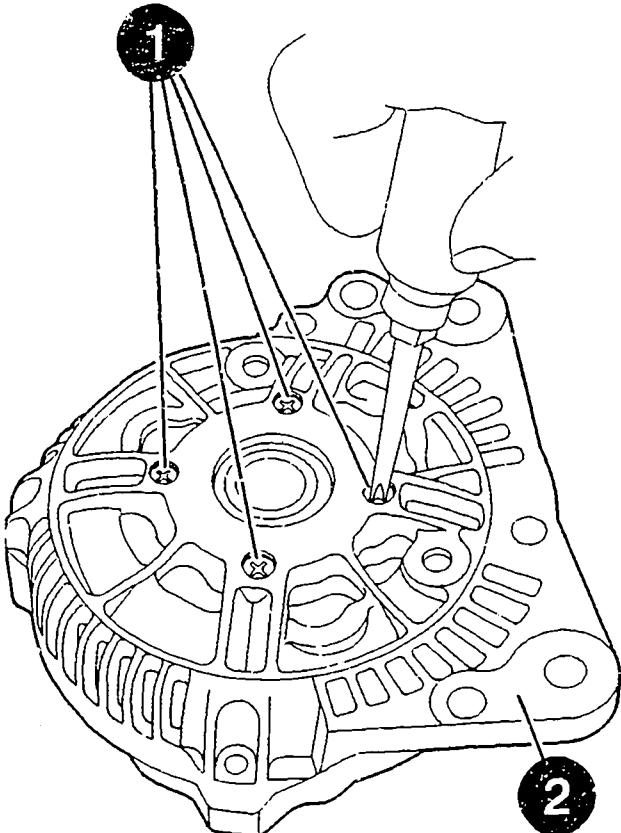
Collar of bolt holes of cover plate faces away from deep-groove ball bearing.

Tightening torque: 2,7...3,5 Nm

Torque wrench: comm. avail.

Continue: III12/1 Fig.: III16/2

KME00585



## ASSEMBLING ALTERNATOR

### Assembling rotor

Position collector ring end of rotor  
(1) in support piece (2).

Position drive end shield (3) on  
rotor.

Press drive end shield with pressing-  
in sleeve onto rotor.

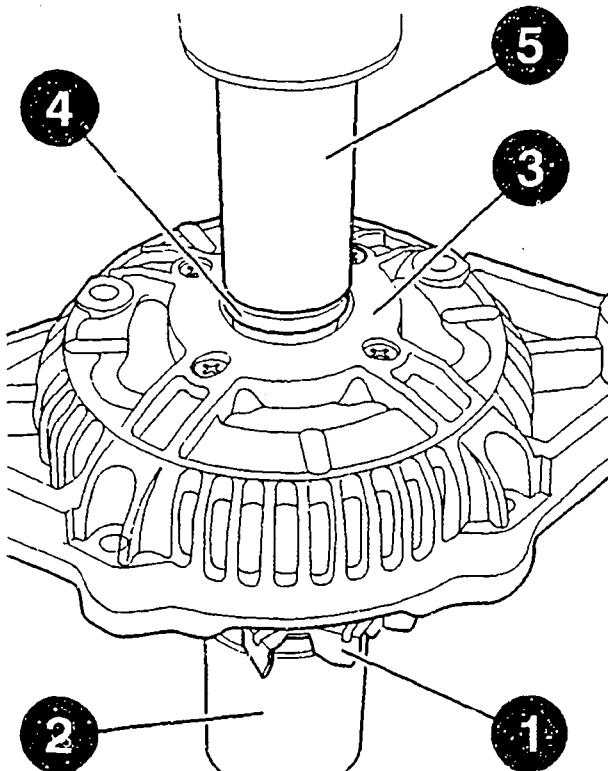
Position spacer ring (4) (small collar  
facing deep-groove ball bearing, large  
collar facing pulley) on rotor and  
press on with pressing-in sleeve (5).

Mandrel press: comm. avail.

Support piece and  
pressing-in sleeve: 0 986 618 162

Continue: III12/1 Fig.: III17/2

KME00586



## ASSEMBLING ALTERNATOR

### Assembling stator

Render stator wires mechanically bright.

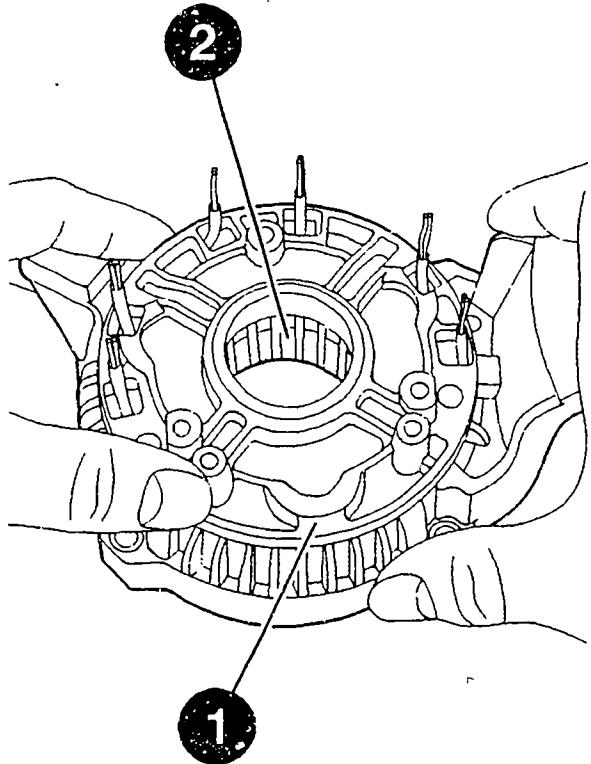
Position collector ring end shield (1) on stator (2).

Pay attention to mark.

Bend stator wires straight if necessary.

Continue: III12/1 Fig.: III18/2

KME00587



## ASSEMBLING ALTERNATOR

Assembling rectifier unit

Bend back detached lug of interference suppression capacitor.

Render retainers mechanically bright.

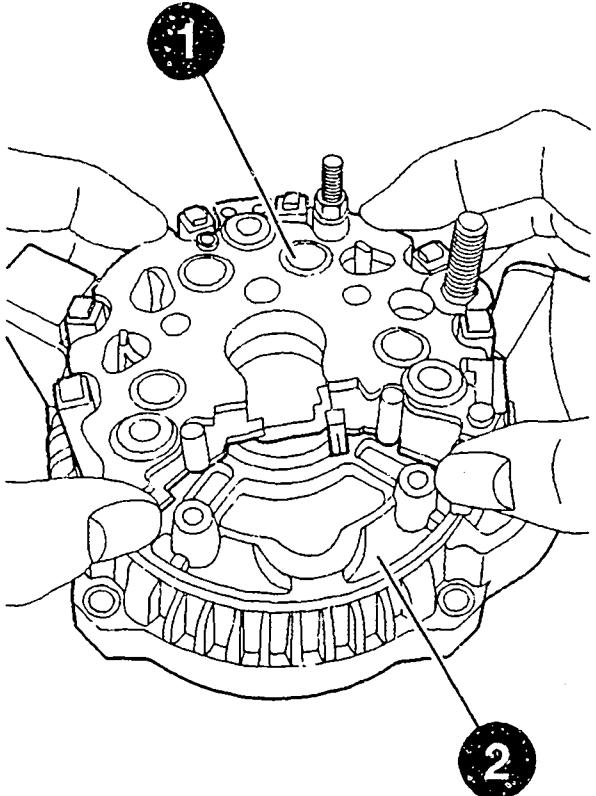
Position rectifier unit (1) on collector ring end shield (2).

**NOTE:**

Pay attention to proper wire routing through rectifier unit.

Continue: III20/1 Fig.: III19/2

KME00588



## ASSEMBLING ALTERNATOR

### Assembling rectifier unit

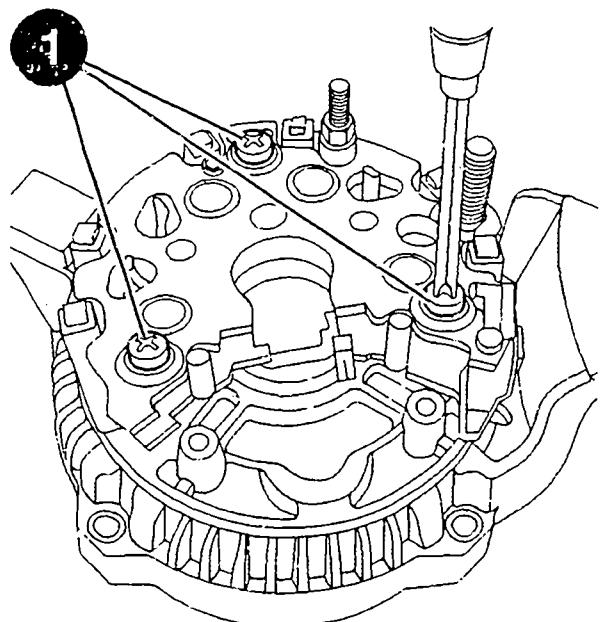
Tighten bolts (1) using torque wrench.

Tightening torque: 3,5...4,3 Nm

Torque wrench: comm. avail.

Continue: III21/1 Fig.: III20/2

KME00589



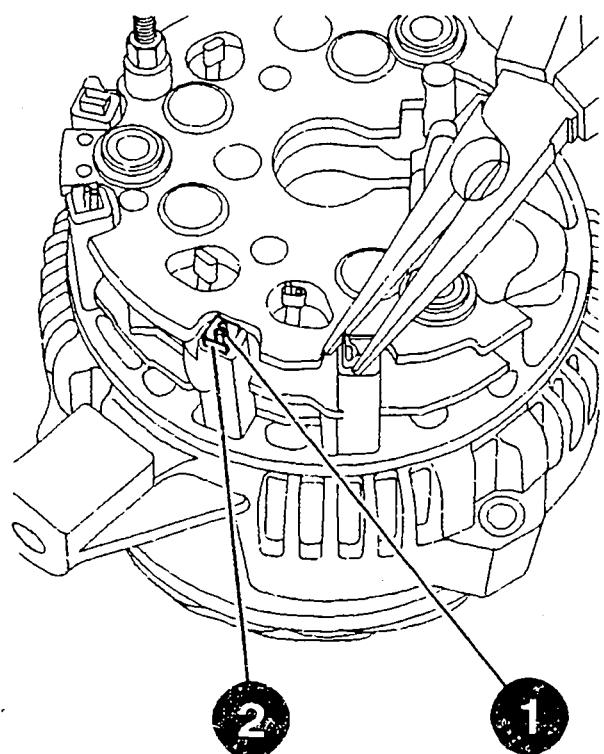
## ASSEMBLING ALTERNATOR

### Assembling rectifier unit

Jam in stator wires (1) by bending over retainers (2) at rectifier unit.

Continue: III22/1 Fig.: III21/2

KME00590



## ASSEMBLING ALTERNATOR

Assembling rectifier unit

Solder stator wires to retainers.

### ATTENTION:

Always use high-temperature solder  
(min. 480 C) and solder cream.

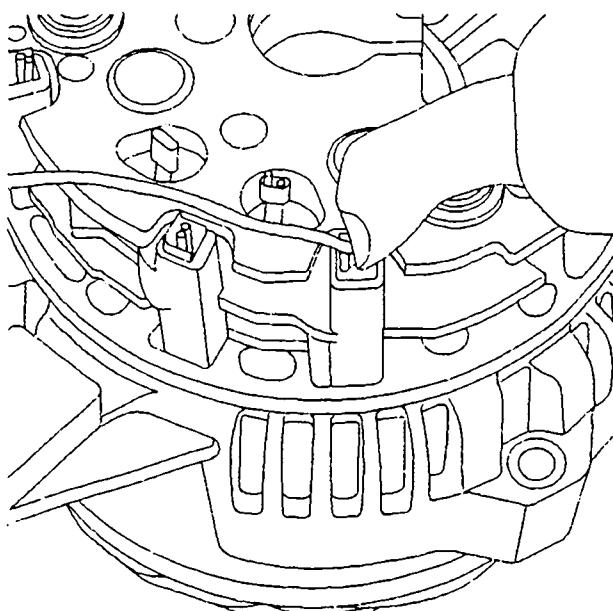
Soldering iron 180 W: comm. avail.

Solder cream: comm. avail.

High-temperature solder  
(min. 480 C): comm. avail.

Continue: III12/1 Fig.: III22/2

KME00591



## ASSEMBLING ALTERNATOR

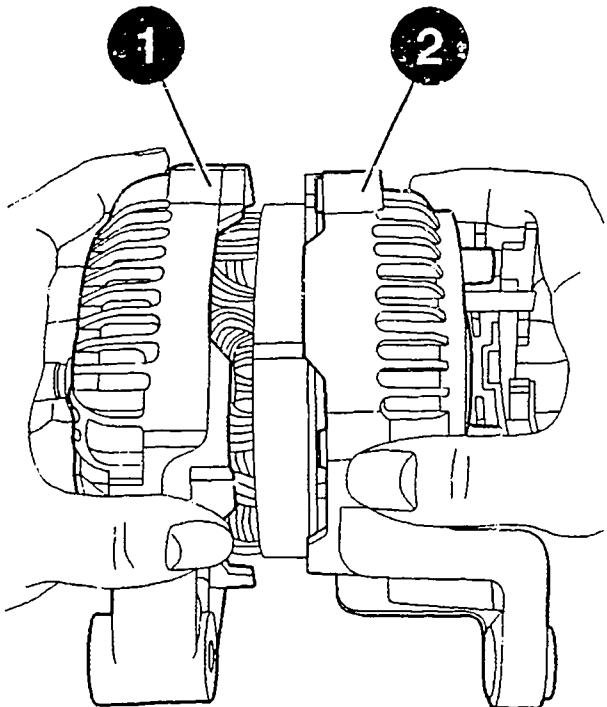
Assembling drive end shield and collector ring end shield

Insert rotor together with drive end shield (1) in collector ring end shield (2).

Align marks made prior to alternator disassembly on collector ring end shield and drive end shield.

Continue: III24/1 Fig.: III23/2

KME00592



## ASSEMBLING ALTERNATOR

Assembling drive end shield and collector ring end shield

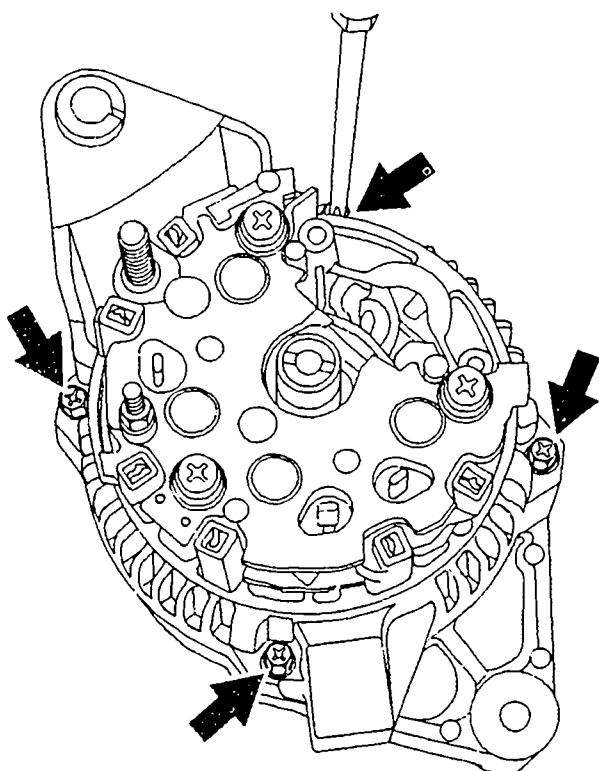
Fit bolts (arrows) and then tighten using torque wrench.

Tightening torque: 4,5...5,5 Nm

Torque wrench: comm. avail.

Continue: III12/1 Fig.: III24/2

KME00593



## ASSEMBLING ALTERNATOR

### Assembling regulator

Clip in (if necessary) regulator (1) at rectifier unit (2) and secure with bolts (3).

Use torque wrench.

#### NOTE:

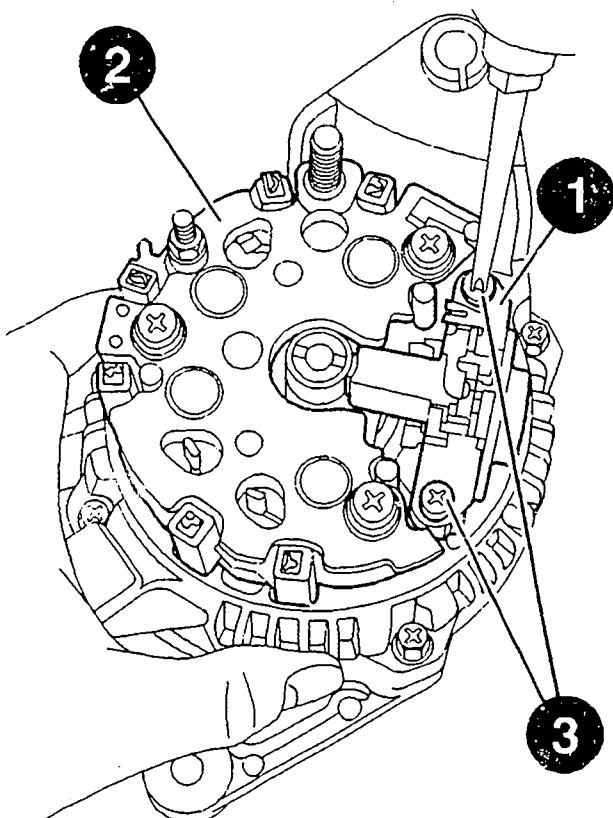
Pay attention to carbon brushes on installation.

Tightening torque: 1,6...2,3 Nm

Torque wrench: comm. avail.

Continue: III12/1 Fig.: III25/2

KME00594



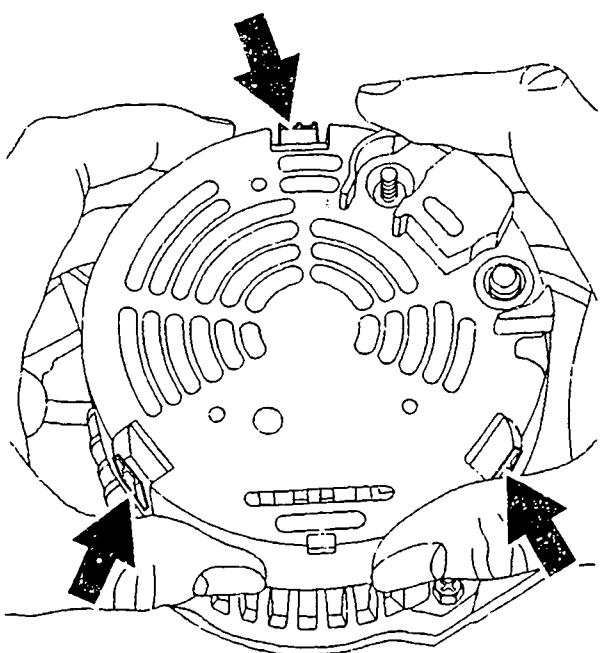
## ASSEMBLING ALTERNATOR

### Assembling protective cap

Position protective cap on rectifier unit and clip in (arrow).

Continue: III27/1 Fig.: III26/2

KME00595



## ASSEMBLING ALTERNATOR

### Assembling protective cap

Attach protective cap with three bolts (arrow).

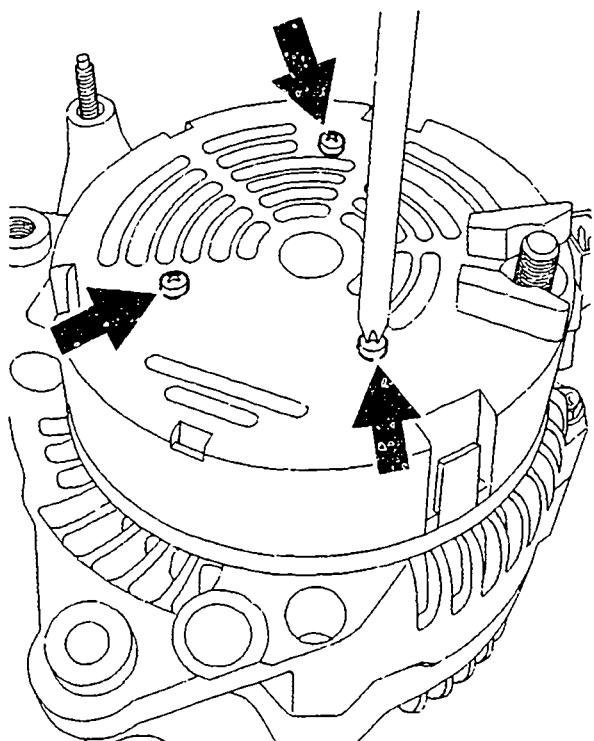
Use torque wrench.

Tightening torque: 0,5...1,2 Nm

Torque wrench: comm. avail.

Continue: III12/1 Fig.: III27/2

KME00596



## ASSEMBLING ALTERNATOR

### Assembling pulley

Attach socket wrench (1) to nut of pulley (2).

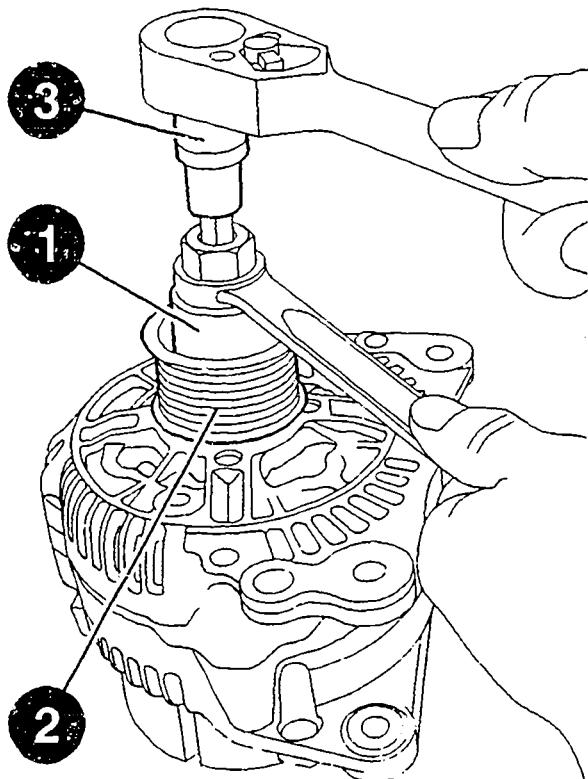
Hold rotor shaft of alternator with multi-point wrench (3) and tighten nut using 22 mm box wrench. Use torque wrench.

Tightening torque: 60...70 Nm

Torque wrench:	comm. avail.
Socket wrench:	0 986 618 152
M10 multi-point socket, long version:	comm. avail.

Continue: IV01/1 Fig.: III28/2

KME00552



## ASSEMBLING ALTERNATOR

### Assembling pulley (free-wheel pulley)

Insert disassembly tool (1) in grooved toothing of free-wheel pulley (2).

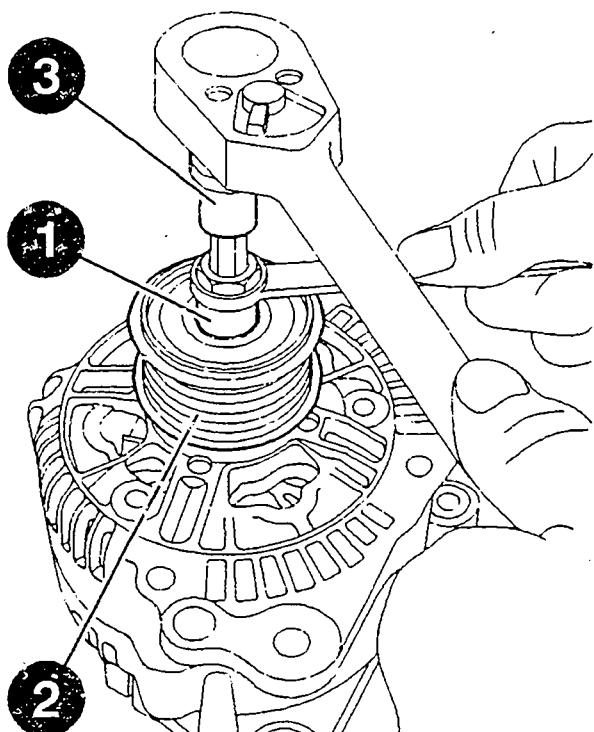
Hold rotor shaft of alternator with multi-point wrench (3) and tighten free-wheel pulley by way of disassembly tool using 17 mm box wrench.

Use torque wrench.

Tightening torque:	75...85 Nm
Torque wrench:	comm. avail.
Disassembly tool:	0 986 619 396
M10 multi-point socket, lcng version:	comm. avail.

Continue: IV02/1 Fig.: IV01/2

KME00553



## ASSEMBLING ALTERNATOR

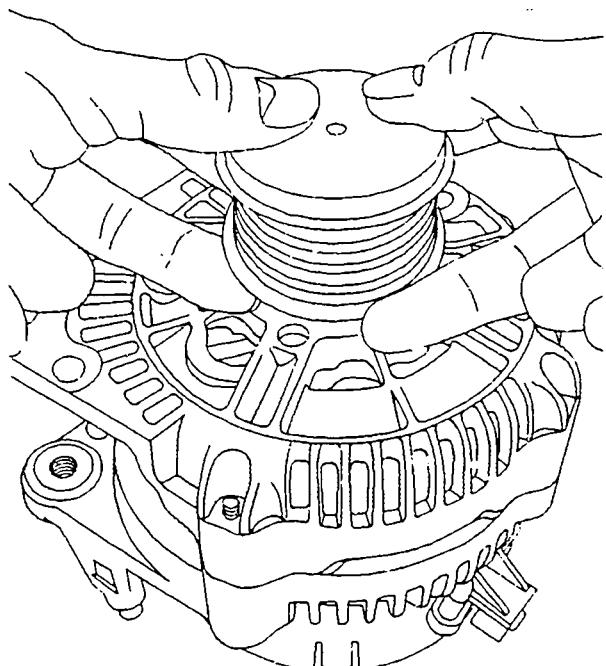
Assembling pulley

Cap is always to be renewed.

Fit clip-on pulley cap.

Continue: IV03/1 Fig.: IV02/2

KME00597



## ASSEMBLING ALTERNATOR

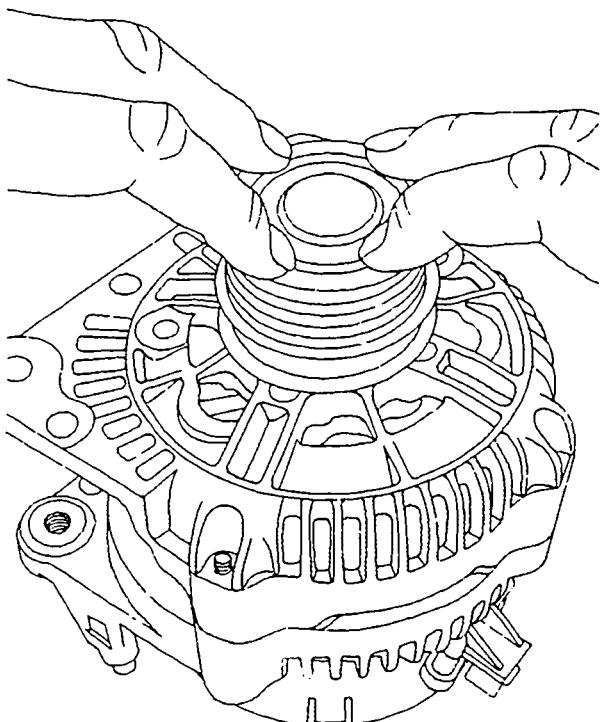
Assembling pulley

Cap is always to be renewed.

Fit press-in pulley cap.

Continue: III12/1 Fig.: IV03/2

KME00598



## ASSEMBLING ALTERNATOR

### Fitting connections

Attach connections B+, D+ and terminal W (if fitted).

Use torque wrench.

### Tightening torques

Connection B+:

10 Nm

Connection D+:

7,8 Nm

Torque wrench:

comm. avail.

Continue: I01/1

## EDITORIAL NOTE

Copyright 1999 ROBERT BOSCH GmbH  
Automotive-Equipment After-Sales  
Service  
Technical Publications Department  
KH/VDT,  
Postfach 30 02 20, D-70422 Stuttgart

Published by:

After-Sales Service Department for  
Training and  
Technology (KH/VSK).

Time of going to press 02.1999.

Please direct questions and comments  
concerning the contents to our  
authorized representative in your  
country.

Continue: IV05/2

---

## EDITORIAL NOTE

The contents of this microcard are  
intended only for the Bosch Franchised  
After-Sales Organization. Passing on  
to third parties is not permitted.

Microfilmed in the Federal Republic of  
Germany.

Continue: I01/1